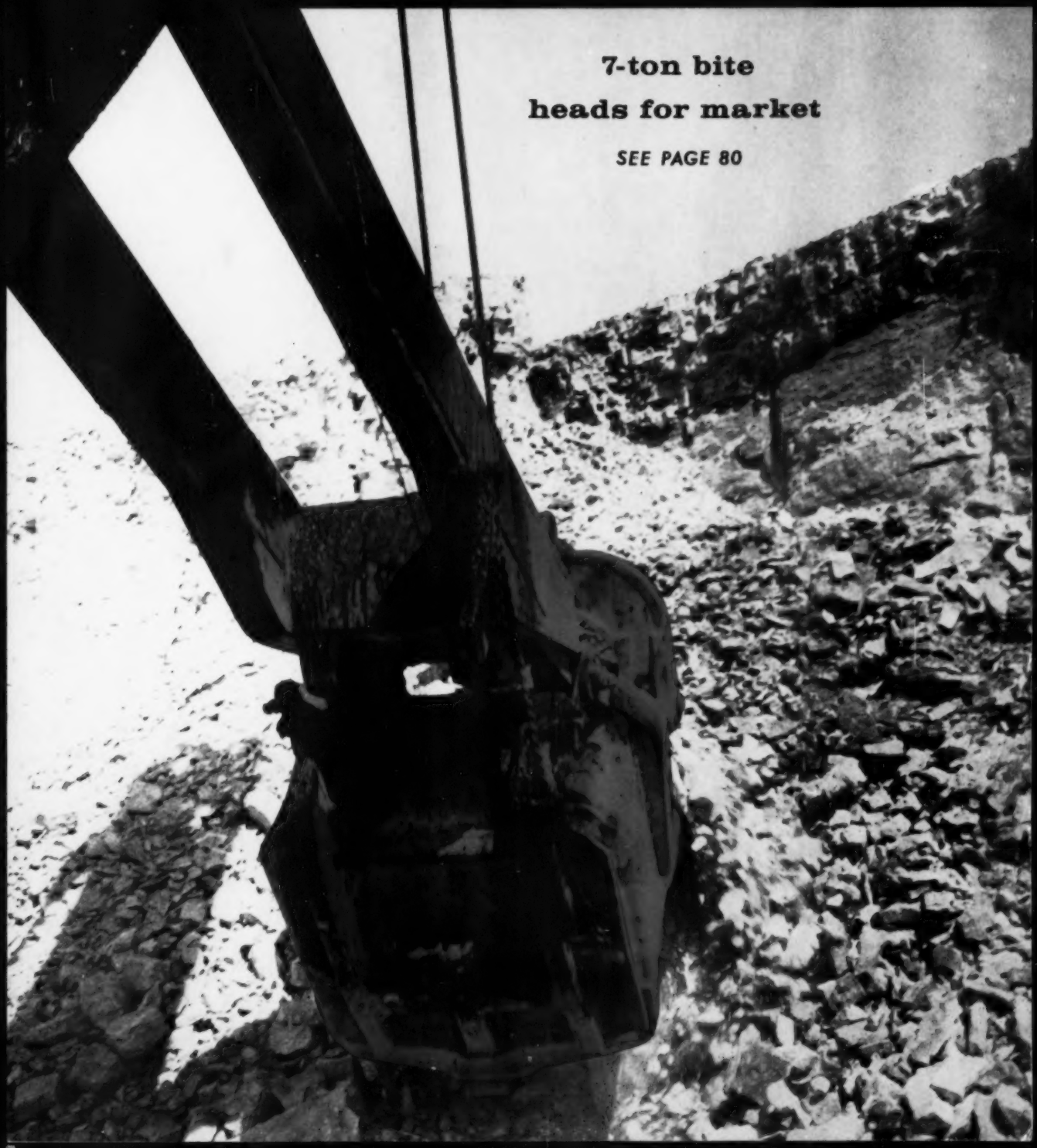
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

JUNE 1960



7-ton bite heads for market

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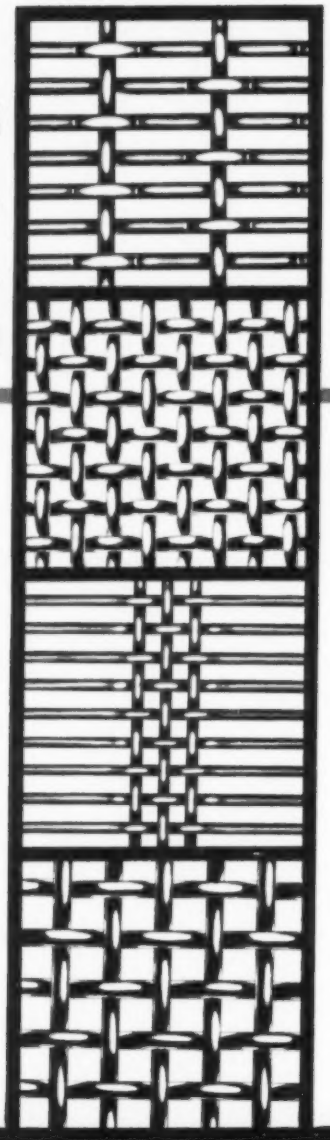
Fights abrasion, fatigue, distortion



The hardest, toughest wire metallurgical science can produce—woven to exceed the industry's top standards for precision and rigidity—levelled and sheared on special machines to absolute flatness and accuracy—then finished with hook strips or edge hooks as straight as a die.

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Ludlow-Saylor Screens and Wire Cloth can be furnished in any steel including SUPERLOY high carbon, LUDLOY oil-tempered, stainless or other alloys; Monel, bronze, copper, brass or any metal that can be drawn into wire.

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most weaves and sizes

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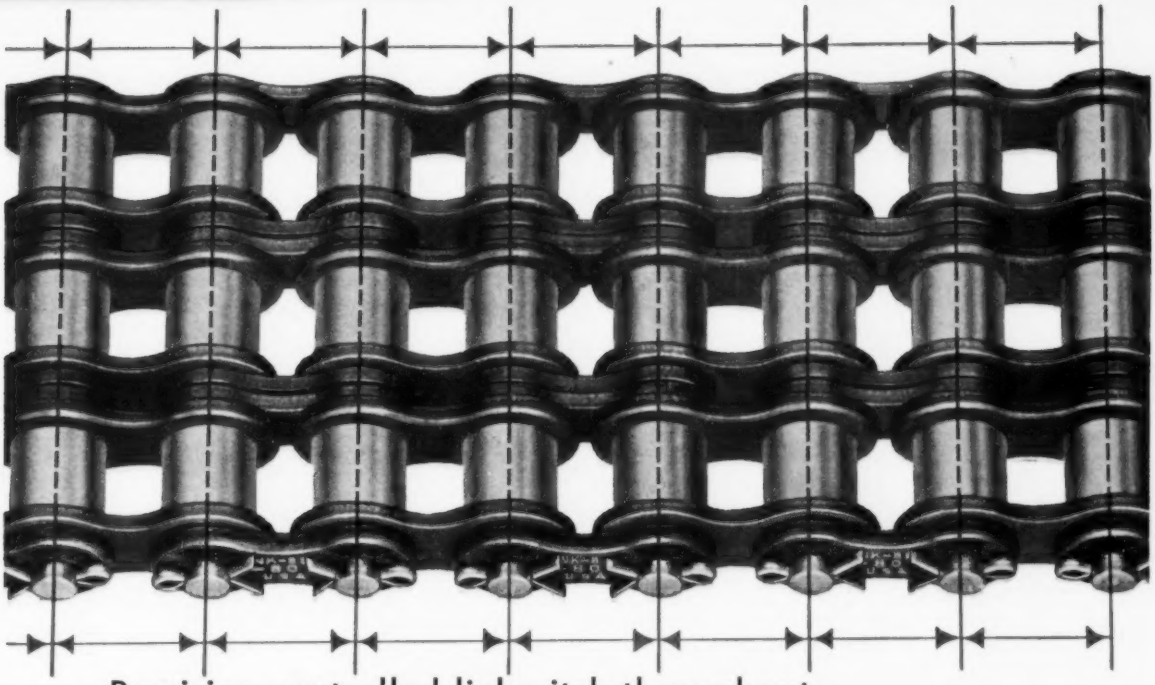

Precision controlled link pitch throughout
LINK-BELT roller chain means

equal length... equal strength

How pre-stressing ensures uniform load distribution of multiple-width LINK-BELT roller chain

Pre-stressing is one of the reasons why Link-Belt multiple-width precision steel roller chains easily handle the grueling loads common on today's drives. It seats and cold works the chain joint parts, assuring equal load distribution across the chain, minimum initial elongation, increased fatigue life.

Pre-stressing is just one of many "extras" that contribute to the *greater dynamic strength* of Link-Belt roller chain. Others include: close heat-treat control, lock-type bushings, shot-peened rollers, pitch-hole preparation. For details see Book 2657.

PRE-STRESSING MACHINE provides the pull that "sets" the parts of Link-Belt multiple-width roller chain. Besides assuring uniform load distribution, pre-stressing eliminates application difficulties on fixed center drives because the chain leaves the factory at precise operational length.

BOOK 2657 has 154 pages of roller chain data. Contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

LINK-BELT

ROLLER CHAINS AND SPROCKETS

15,301

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

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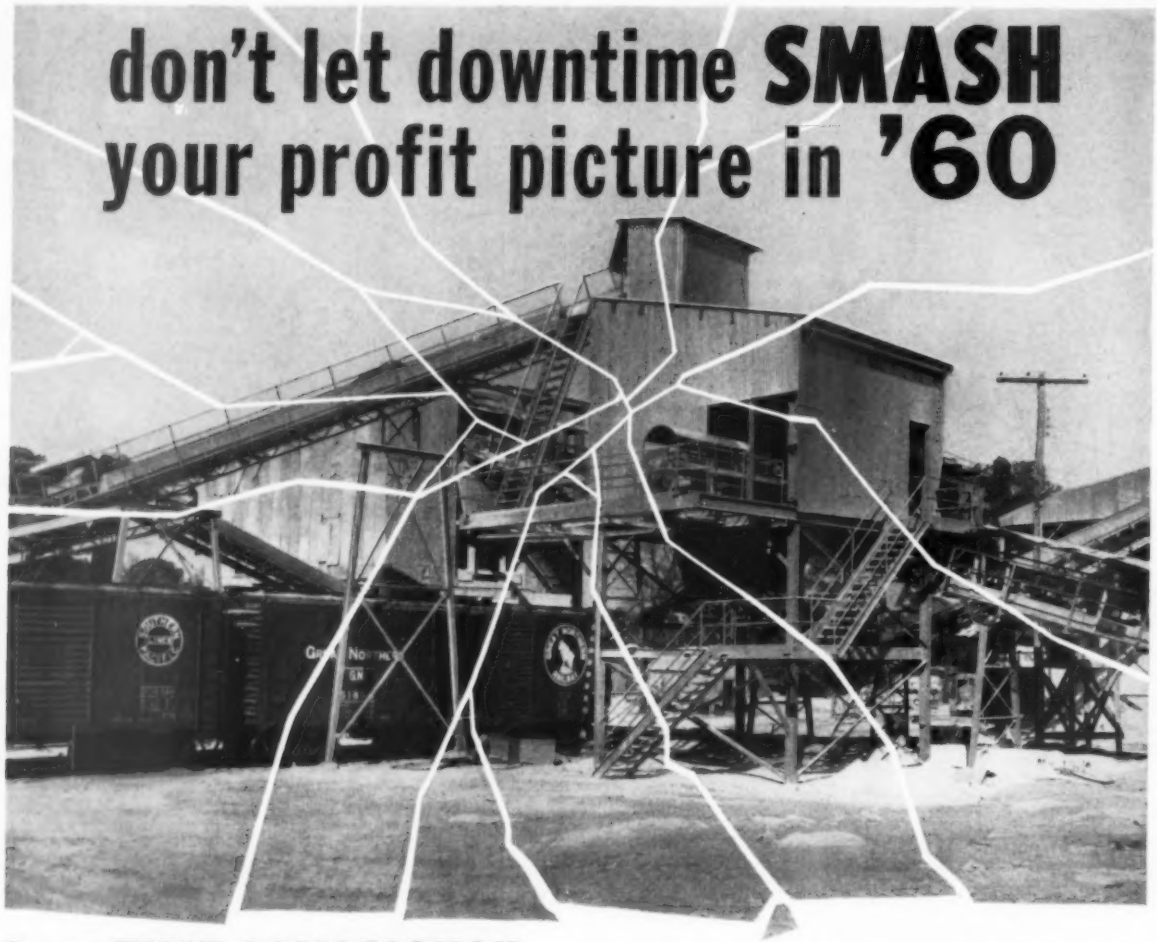
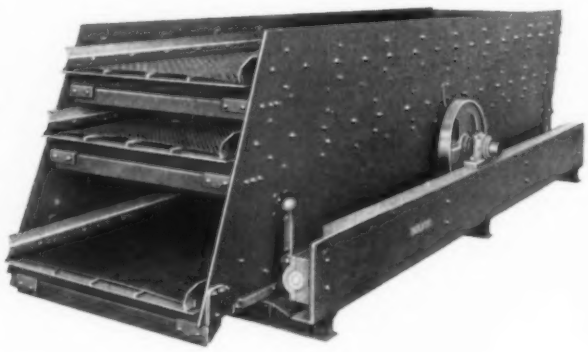
PIT AND QUARRY, June, 1960. Vol. 52, No. 12. Published monthly by Pit and Quarry Publications, Inc., 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U.S., possessions and Canada. Central and South America $10 for 1 year, elsewhere $15. Single Copy $.50 except $1 for January, May and July. Entered as second class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. *Postmaster: Please send notices on Form 3578 and copies returned under label Form 3579 to 431 South Dearborn Street, Chicago 5, Ill.*

don't let downtime SMASH your profit picture in '60



Put "TIME CONSCIOUS" SECO SCREENS on-the-job in your plant



When the going gets the toughest and you're running double shifts or around the clock . . . your greatest worry is screen failure! Because, if it happens, right then and there the cream of the profits is taken out of your pocket. Don't let this happen to your plant! Get "time conscious" SECO screens on your job . . . they're engineered and built to stand the gaff under peak load conditions . . . year after year . . . on the toughest screening jobs.

Check NOW to see if you need screens replaced! If you do . . . get set . . . be safe . . . with SECO . . . the best profit insurance you can put in your plant.

SECO builds over 450 models in 4-bearing and Twin Bearing screens, to give you fast, accurate, trouble-free screening of any materials from coarse stone to ag-lime.

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SCREEN EQUIPMENT CO., INC.
Buffalo 25, N. Y.

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"TIME CONSCIOUS" VIBRATING SCREENS

PIT and QUARRY

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To subscribers: When requesting change of address, kindly send old as well as new address.

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✓ *Indicates a* PIT AND QUARRY *staff-written report*

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Whatever your requirements for production check-weighing of packaged materials, W-C can supply a job-engineered system to meet them. Systems can be automatic or manual; can weigh in motion or stop-and-go; can segregate packages according to specific zones of under- or overweight, or according to a single pre-selected tolerance. They can provide practically any type of readout you want, and can be readily integrated with tape-fed, punched-card and other types of data handling systems.

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Typical applications include: Checking individual cement bag weights to insure uniform fill after coming from bagging machines.

Write for new Bulletin 50

W-C

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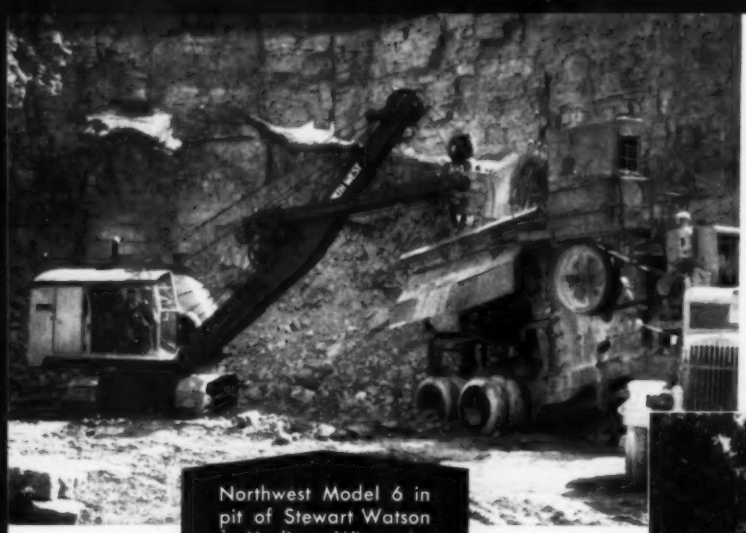
MORE NORTHWESTS for WISCONSIN Aggregate Producers!



Northwest Model 6 in pit of Stewart Watson at Madison, Wisconsin.

Daanen & Janssen handle some heavy digging in their quarry at DePere, Wisconsin.

WISCONSIN Aggregate Producers have found the answer to their pit problems. Three more Northwests have gone into well operated pits in Wisconsin. Stewart Watson is using a new Model 6 Shovel in his quarry at Madison. Daanen & Janssen is feeding a primary with a new Model 41 at De Pere and Yahara Materials, Inc. is feeding bank run to a Cedar Rapids plant at Waunakee with a new Model 6 Dragline.

These Northwests are fast and they're always ready to go. We hear it everywhere and Northwest operators and owners will tell you so. They maneuver easily in the pit and around stock piles or bins.

The Feather-Touch Clutch Control, with its true "feel" of the load combines with the smooth performance of Uniform Pressure Swing Clutches to make spotting the dipper or bucket easier, reducing spillage.

Machinery Bases and Machinery Side Frames are heat-treated, alloy steel castings that take the strains of rock digging and eliminate constant rebuilding. The Northwest Dual Independent Crowd utilizes force most independent crowd shovels waste and makes greater output in quarry work possible. If you are planning new equipment for your pit, look into the reason for the many repeat orders for Northwest equipment placed by quarry operators. Northwest advantages make money. A Northwest man will tell you all about them.

A Northwest will give you high output in digging like this. Yahara Materials, Inc. at Waunakee, Wisconsin.

G-16-5

NORTHWEST ENGINEERING COMPANY
1515 Field Building 135 S. LaSalle Street
Chicago 3, Illinois

NORTHWEST *Always Ready to* **GO**

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SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

LUBE LOGIC Tips for more

How to put engines in mothballs

As hard as you try to keep all your equipment at work all the time, invariably there'll be times when you just have to prepare a piece of motorized equipment for an idle stretch. Long idle periods can take a heavy toll on an unprotected engine. These eleven steps assure you that the engine will be in as good condition when you start it up again as it was when you put it away.

1 Run the engine for a while and drain the oil while it's hot. Install new filter element.

2 In mild climate, drain and flush cooling system and refill with rust-inhibited water solution. In subfreezing climate, drain, flush and refill with rust- and corrosion-inhibited anti-freeze.

3 Refill crankcase with Texaco Ursa Oil Heavy Duty, idle the engine fast for about 20 minutes, and shut it down. For diesel engines, add 3% Ursa Oil Heavy Duty (of correct seasonal grade) to the fuel before this idling period, and afterward fill the tank with a good diesel fuel.

4 Remove spark plugs and squirt a little Ursa Oil Heavy Duty into spark-plug holes while engine is being turned over. Dip plug electrodes in Ursa and replace.

5 Coat each lobe of distributor breaker cam with Texaco Rustproof Compound L. Replace distributor cap and seal breather hole in cap with waterproof tape.

6 On ohv engines, remove valve cover and squirt Ursa Oil Heavy Duty on rocker mechanism, interior of valve cover, and between cylinder block and side plate cover.

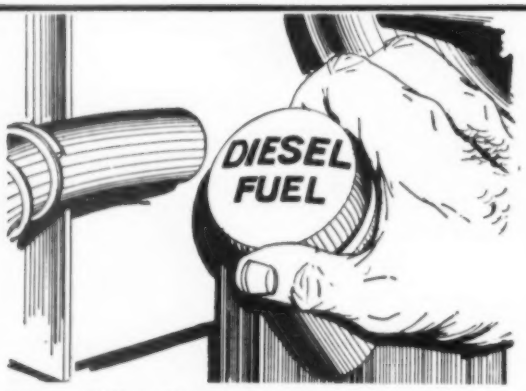
7 On gasoline engines, drain fuel tank, lines, pump, strainer and carburetor. Afterward, close all openings and reconnect all fittings.

8 Remove battery, store it in cool dry place, keep water level up. Recharge periodically. Apply Texaco Rustproof Compound L to battery terminals, leads and container. Loosen fan belt; insert paper between belt and sheaves.

9 Clean and dry outside of engine. Touch up unpainted spots with Texaco Rustproof Compound L.

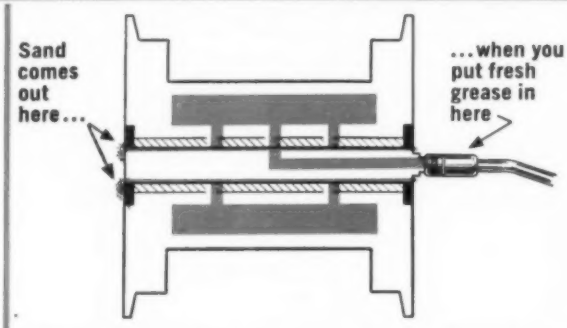
10 Seal engine air intake, breathers, exhaust and exhaust expansion joints with waterproof tape or heavy paper secured with waterproof tape.

11 Tag engine and engine parts with detailed information on rustproof measures taken.



Identify the fuel you want

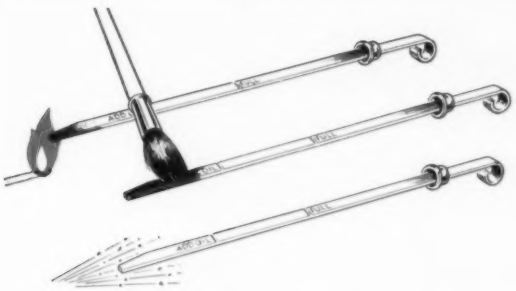
Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say you'll be "bailing out over Denver." It's happened. Best way to avoid its happening to *you* is to mark your fill cap; "Diesel Fuel" or "Gasoline." Then nobody should make any mistakes.



Track-roll enemy No. 1: sand

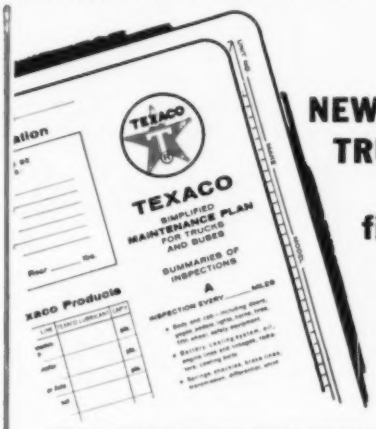
If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Most track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.

efficient maintenance



How to read dipsticks without squinting

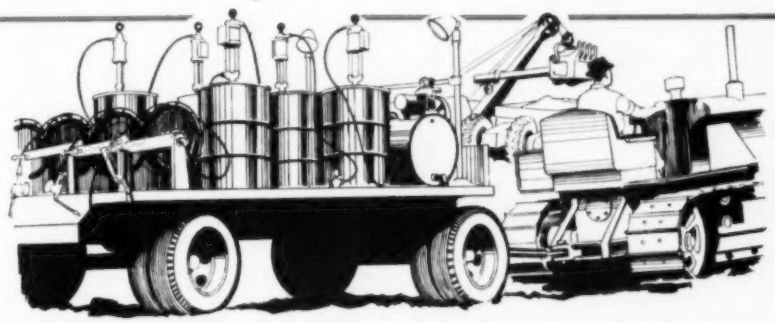
The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so that the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube box.)



NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Get yours now.

Do-it-yourself lube rig trailer



Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole Simplified Lube Plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching it to any truck, so it's just as mobile as a truck-mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

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Every month or so we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local TLE is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

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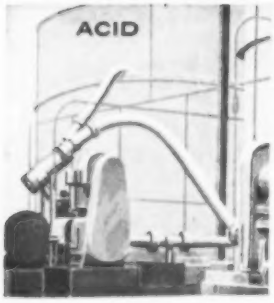

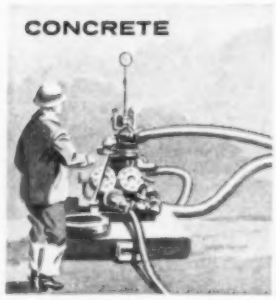

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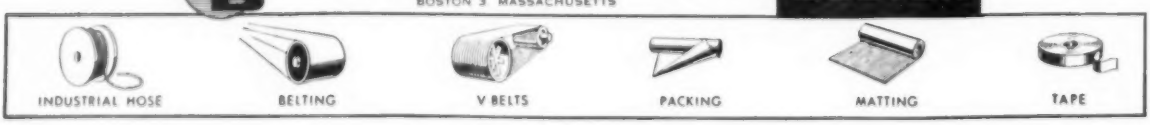

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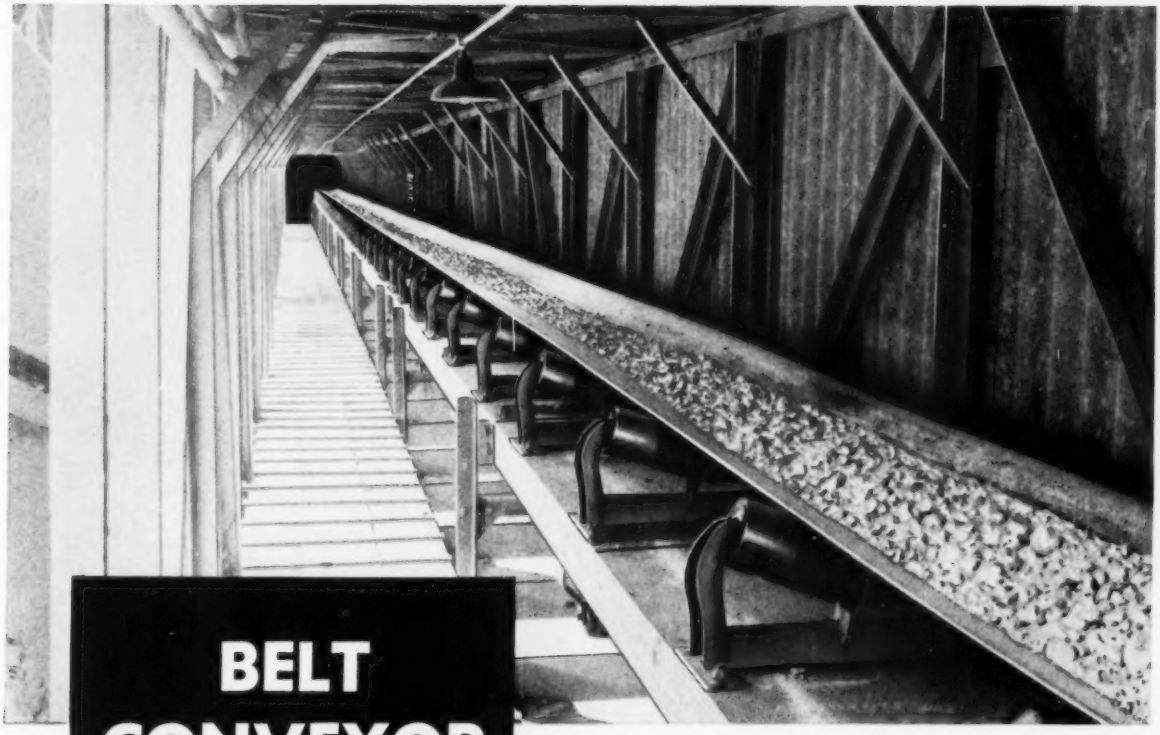

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handles greater tonnage at lower cost

Tons of crushed stone and aggregates are carried fast, efficiently and at a lower cost per ton on STEPHENS-ADAMSON Belt Conveyors. S-A quality engineered conveyor components increase materials handling efficiency while reducing equipment "down time" to a minimum. Long-lasting, low maintenance dependability is built into every S-A belt conveyor. Convey with S-A . . . the Equipment that's designed and built by the men who know conveying best . . . STEPHENS-ADAMSON.

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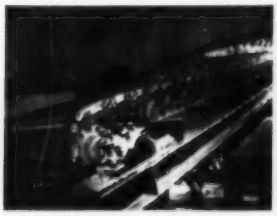

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BULLETIN 255

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Coates Grinding Balls are made of fine-grained, high-carbon steel. They are especially forged to attain more perfect sphericity, then heat treated to extreme hardness, but with toughness to prevent shattering under the stress of milling. Call for Coates Triple-Forged Grinding Balls . . . built with care for longer wear.

C857-4

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COATES STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

Washington News Letter

By S. HERBERT UNTERBERGER

The Long-Run Housing Market

THE United States Department of Commerce recently has taken a long-run look at the housing market for the 1960's and the 1970's. Generally, the results are optimistic. In the view of Commerce Department members, the principal factors are family growth and income. This is what they have discovered about each of those factors.

With respect to family formation, Commerce Department spokesmen point to the well known fact that the birth rate rose during World War II and continued to rise through 1957. Although the birth rate eased a bit in the last two years, it has remained about 50 percent higher than in 1940.

Although one would expect that a high birth rate with the inevitable result of larger families would increase the demand for larger houses, according to the Department of Commerce, this is not the case. The conclusion is that the size of the house which a family buys is more dependent on income than on the number of children.

With respect to the future, the Commerce Department report states that the children born since the beginning of World War II are just now becoming of marriageable age. It is noted that over 80 percent of women married before they reached their 25th birthday. To date, the number of new households formed each year has not reflected the population boom. Since 1950, the figure has held at about 500,000 annually. On the basis of what is known about population trends, however, the number is expected to rise to between 800,000 and 1,000,000 annually.

A significant feature, not generally pointed out in connection with household growth in the last decade, has been the substantial rise in households other than those of married couples, especially those headed by women. This trend has reflected both increasing numbers of people who survive into the middle and upper age brackets, plus a strong tendency for older people to maintain separate households, rather than consolidate their households with the families of the younger generation.

Since 1950 such households have increased by about 400,000 annually. This has been a very important factor in maintaining the demand for housing although the number of new families formed has not increased substantially. It will continue to be an important factor since the proportion of older people in the population is continuing to rise.

Finally, in connection with these population trends and their relation to housing demands, the Commerce Department report points out that approximately four out of five newly married couples set up a household within a year after marriage. However, they do not buy a house at that time. Generally, they rent for some time before they are ready to buy. Only about one-sixth of the non-farm family heads under age 25 own their own homes.

Home ownership rises to over two-fifths of couples in the 25- to 34-year age group and to nearly two-thirds of those in the 35- to 44-year age group. After that there is little further rise in the proportion owning homes for the older heads of households up to age 65.

After age 65 there is a decline in this proportion. From these facts it may be concluded that in the near future—the next 5 to 10 years—there will be a growing demand for rental housing. Thereafter, based on population trends, it is reasonable to expect a resurgence of demand for the purchase of single-family homes.

The kind of homes they will be prepared to purchase will depend in great part on their incomes. In this connection, the events of the last 10 years are useful in predicting what is likely to happen. During that period, with increasing prosperity, both the value and size of the homes bought have increased.

The one thing that has remained practically constant is the relationship between the home buyer's income and the value of the property which he has bought. Ever since the end of World War II, the value of the property bought has averaged just about twice the annual income of the buyer. If this relationship continues—and there is every reason to believe that it will—the value and kind of houses that can be sold will depend entirely on the incomes of the buyers.

This is especially true in view of the fact that there is no longer very much room to liberalize the terms of the transaction. Down payments are at a virtual minimum, and the length of mortgage loans is at a virtual maximum. The only factor left is some change in the interest rates, which, at the moment at least, is going in the direction of increases, rather than decreases.

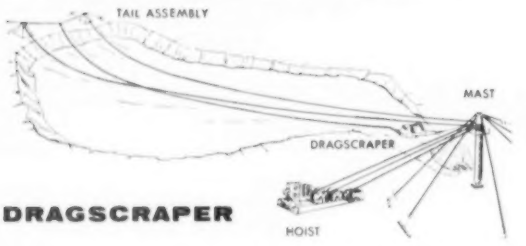
The total picture painted by this government agency is one of an expanding housing industry for both the 1960's and the 1970's. Whether the volume of rental housing which will be required in the 1960's will actually be built is a substantial

(*Continued on page 75*)

Cut Materials Handling Costs in Half . . . Dig *and* Haul with a Sauerman Machine

Operating costs as low as 6¢ per ton are reported by Sauerman DragScraper and Slackline Cableway owners. This cost includes labor, power and maintenance when digging free-caving material on average haul distances.

When you use a Sauerman DragScraper or Slackline Cableway, one machine does *both* digging and hauling from deposit to plant. No double handling is required. You cut labor and equipment costs in half—or even more—because a single Sauerman Machine, controlled by one man, replaces the multiple equipment needed for other methods.

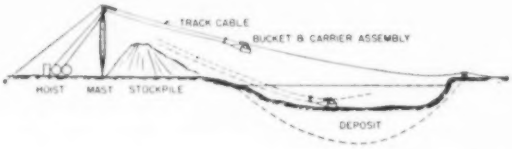


DRAGSCRAPER

DragScrapers are usually recommended for bank or pit deposits. They dig from hillsides or underwater as easily as on level ground and can haul directly to hopper or field conveyor. The Sauerman DragScraper hoist is designed for continuous duty and many years of service. The operator's control station may be remotely located for maximum visibility of deposit and plant.

DragScrapers are built in sizes from 1/3 to 15 yds. to satisfy practically all tonnage requirements.

SLACKLINE CABLEWAY



When deep digging is required or anticipated in the future, a Sauerman Slackline is usually best for the job. This powerful excavator can dig 100 ft. below water, lift its load and deliver the material to a stockpile on a 1000-ft. span.

The Slackliner Bucket inhauls at high speed and dumps automatically. Dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point, completing the fast operating cycle.

The use of a stockpile permits a single 2-yd. Slackline Cableway to handle the material requirements of a 200-tph. plant. Slacklines are built in sizes up to 3½ cu. yds.

★

Find out how you can save with a Sauerman Machine. Write or call, giving tonnage requirements and a description of your deposit. Sauerman engineers will supply their recommendations on the most economical machine for you.

SAUERMAN BROS., INC.

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50th Anniversary Year

CRESCENT DRAGSCRAPERS • SLACKLINE AND TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Labor Developments

Landrum-Griffin Law In Operation

THE Secretary of Labor has just issued his six-month report on operations under the recently enacted Landrum-Griffin Act, known officially as the Labor-Management Reporting and Disclosure Act of 1959.

This report includes some startling information. Congress passed this law in order "to eliminate or prevent improper practices on the part of labor organizations, employers, labor relations consultants, and their officers and repsentatives . . ." According to the Secretary of Labor, approximately 17 million union members, including some 500,000 union officers and an indeterminate number of employers and labor-management consultants, are affected by the law.

Secretary Mitchell's general conclusions are both heartening and disheartening. They are disheartening in that they reflect on the large volume of improper practices which, apparently, have been occurring. They are heartening in that they report progress in eliminating those practices.

In general, the report states that union members throughout the country have been expressing themselves more freely at their meetings; union constitutions are being revised along more democratic lines; union members are taking a greater interest in union elections; a number of ex-convicts holding union office in violation of the law have been removed from posts of leadership; 103 trusteeships have been terminated; and, in most cases, both labor officials and employers have expressed

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

their intent to comply with the law.

In general, the report continues, interest has been awakened on the part of many union members in the operation of their organizations. This has been reflected in the letters and complaints received by the Labor Department during the previous six months. Although many of the early complaints technically did not concern violations of the law, because the alleged actions took place before its effective date, the resulting investigations indicated, in a number of instances, that the standards in the legislation had not been observed previously.

To date, the Labor Department has processed nearly 60,000 reports. In addition, it has investigated 820 complaints which represent a much larger number of individual complainants. Of these, 297 had to be closed when the facts showed that the alleged violations concerned events prior to the effective date of the law, or otherwise concerned matters in which the Department of Labor was powerless to act.

Of the more than 523 cases pending for investigation by the middle of March, about one-fifth, 110, resulted from complaints that democratic rights had been denied in the conduct of local or national elections. Although this indicates that the practice of preventing members from having a voice in the affairs of the union still continues rather broadly, the Department was also able to report substantial progress. It cited as an example a local union which has formerly restricted attendance at meetings to parent body members, who numbered only 600 out of a total membership of 6,300. Since the law was passed, this local for the first time permitted all members to attend meetings.

Other current investigations involved 51 alleged embezzlement violations, 53 alleged fiduciary violations, 40 alleged cases of ex-felons and Communists serving as union officers, 23 alleged violations of trusteeship provisions, 22 alleged violence cases, 17 alleged unlawful disciplinary actions, 18 alleged failures or refusals of union officers to supply copies of the collective bargaining agreements to members, plus a variety of other allegations.

It should be remembered, of course, that not every allegation is necessarily accurate. The important point is that a reasonably large number of union members are taking advantage of this avenue now available for obtaining clean, responsible union leadership. It is still too early for the Department to report any real progress in investigating these complaints, and in correcting them where necessary.

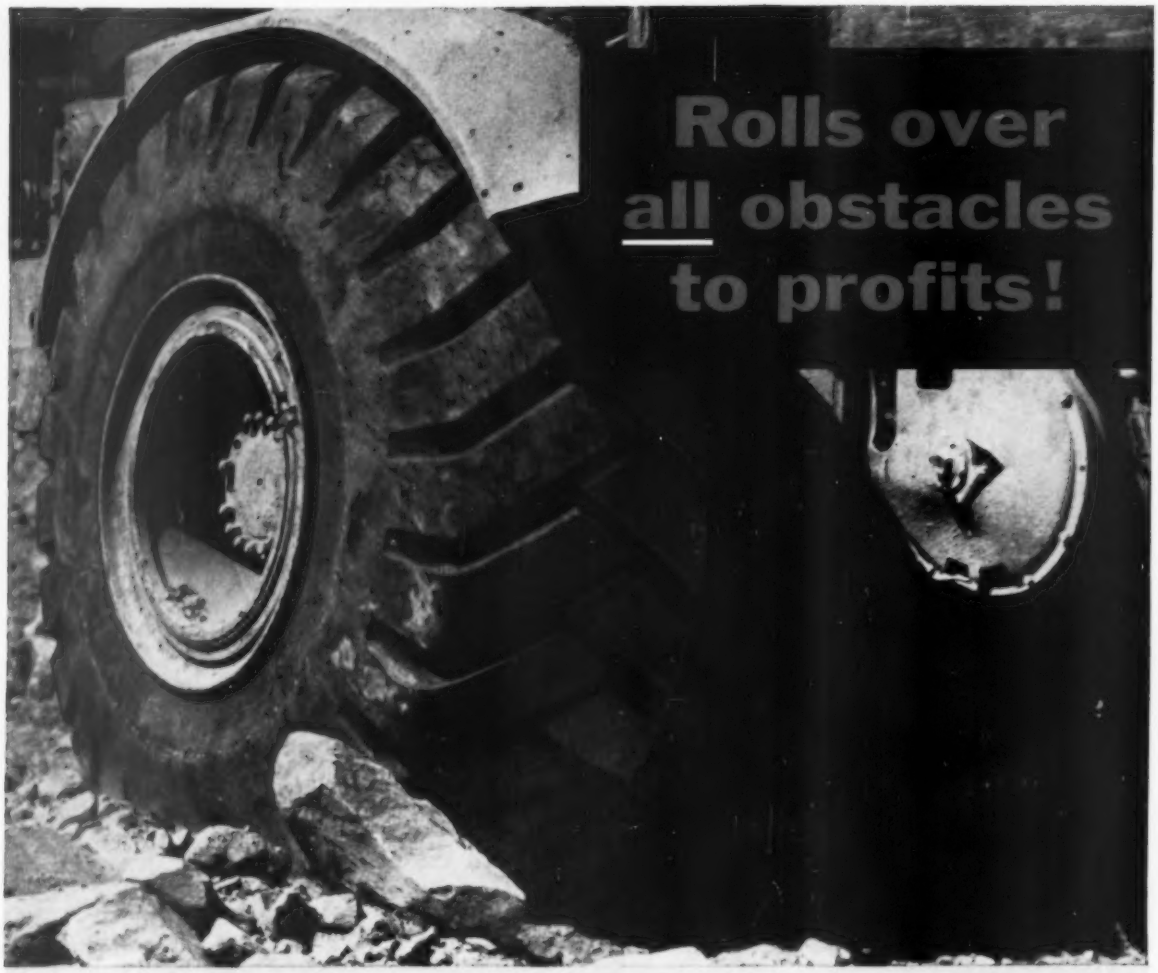
It is heartening to find that, in a somewhat untraditional manner, the Department of Labor and the Department of Justice are collaborating in making a case-by-case investigation involving the alleged criminal acts. This should speed up the correction of these abuses substantially.

A few of the typical complaints reported by the Secretary of Labor make interesting reading. The following are typical:

"Our union is operated through threats and intimidation and the union records are destroyed since the law was passed."

"We have never been furnished with any agreement or contract made and executed between the XYZ and our union. At our regular meeting

(Continued on page 76)



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reduce downtime losses to build up more profit for you!

Projects that rip ordinary tires and schedules to shreds are naturals for extra rugged General Off-the-Road Tires. With stronger-than-steel Nygen cord construction and a deep-digging, high-flotation tread, Generals are built to take on rock, stumps, mud, sand without let-up or let-down. And that means more work done...more profit counted every day of the job! Be sure of both on your next project with General Off-the-Road Tires.

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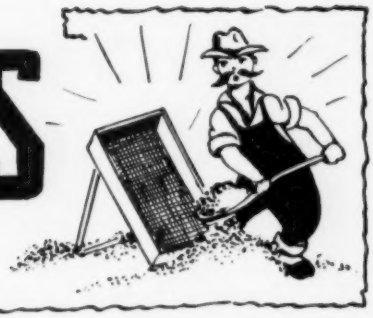
SCREENINGS



By RAY L. SMITH JR.

FOR OBVIOUS reasons the average magazine publisher is rushed with invitations to various functions. Usually the invite has a nice ring, but always with the ulterior motive—making space in the magazine.

Recently an honest invite came across our desk:

Dear Screenings Editor:

The Midwest Regional Conference of Novice Open and Professional Hog-Callers (male and female divisions) are holding their annual tryouts and Invitational Championships at the City Eye-sore Pens. Jack Paar, as you know, is eligible this year what with all his mouth-watering sludge and publicity. Old perennials like Paul Butler (master's champion for nine years running) and woman's champ Elsa Maxwell will defend their respective titles.

Orval Faubus, though a non-contestant, will show his leather-lunged abilities in an ear-splitting demonstration of Arkansas hog-calling.

Many other loud-mouths—too numerous to mention —will also be on the bill.

A side-light of this year's program is to feature a distance spitting contest. Record-holder Ted Williams, *cum laude* specturation honororium, has accepted our humble invitation.

We hog-callers (SRCNOPHC) sincerely hope you can be on hand as a judge and guest of honor. Your presence always adds color.

Sincerely,

P.S.: While you ain't eligible to compete against amateur hog-callers, your qualifications are in order for a go against the pros.

Potpourri and Succotash

A Texas recruit was observed by his Chief depositing dimes in a Coke machine. As each bottle of beverage was delivered, the Texan would grab it and eagerly deposit another dime. After a dozen bottles had been delivered, the Chief approached the lad. "Don't you think you have about enough?" he inquired.

"What!" exclaimed the boot. "You want me to stop right in the middle of a winning streak?"

One Caveman to another: "I don't care whether you agree with me or not—but we never had this crazy weather until they started using those bows and arrows."

Legend on a Hypochondriac's Tombstone: "See, I told you I was sick."

A Texan arriving at the gate of his eternal home remarked: "I never thought heaven could be so much like Texas."

"Son," replied the gatekeeper, "this isn't heaven."

A traffic expert said recently that if all the cars in the nation were placed end to end, some fool would pull out and try to pass 'em.

Never be concerned about finding your station in life. Somebody is sure to tell you where to get off at.

During the war a young pilot landed on an aircraft carrier and hurried to the skipper to say "What a day I've had—I shot down seven Jap planes, sunk a destroyer and left a cruiser listing."

"Velly good, Yank, but you make *one* mistake!"

Do you know what General Custer said when he saw the Indians coming? "INDIANS."

Woman fishing: "Have you another cork dear? This one keeps sinking."

A notorious pennypincher recently wangled a trip to Paris and managed to scrounge a ticket to a French play, a mystery. Aware of the European custom of tipping the usher for showing one to one's seat, he resigned himself to the inevitable and, as he took his seat and accepted the program, dropped a single sou into the usher's palm.

The usher sneered down at the paltry gratuity. Then, leaning over to our friend, the usher whispered in his ear, "The butler did it."

Hint to Do-It-Yourself fans: To avoid hitting finger with hammer, hold it in both hands.

The playful, middle-aged wolf sidled up to the brunette. "Where have you been all my life?" he asked.

She looked at him coolly and replied: "Well for the first half of it, I wasn't born!"

Most magazine editors are affable people who like to accommodate subscribers. One editor, however, felt the following letter was asking too much:

"Dear Sir: Last year you printed an article, at least I think it was in your magazine, that interested me very much, but I have forgotten what it was. I lost my notes on the subject and can't find the magazine. Will you send me another copy of same, if it was your magazine?"

Who else...

...but **HOUGH** provides these facts?

This factual data on PAYLOADER four-wheel-drive, rubber-tired tractor-shovels in each of 1, 2, 3, and 4 yard sizes points up the advantages of their design, performance and safety features. Comparisons include all competitive units from manufacturers' printed specs as of April 1, 1960.

1 cu. yd. H-30 PAYLOADER®

More Power: H-30 has 17% more horsepower than next most powerful machine in this category.

More Dumping Clearance and Reach: The H-30 has 4" more clearance and over a foot more reach.

Safety Boom Arms: All moving members pivoted in **front** of operator. **Exclusive** on the H-30.

Safety Ladder: Makes access to the operator's compartment easy and safe. Another **exclusive.**

"Full" Power-Shift Transmission: No manual shift, working to travel range. "PAYLOMATIC" transmission Hough designed and manufactured.

Four-Wheel-Brakes: Exclusive on the H-30 they permit equal stopping in both forward and reverse. Also sealed against dust and dirt.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. H-30 **exclusive.**

Closed Hydraulic System: Sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type filter and fine-mesh screen. Another **exclusive** H-30 protective feature.

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. Another **exclusive.**

Easy Accessibility: No other comparable unit has H-30 accessibility. Dip stick, filler cap, batteries, connections and service points reached from ground level.

2 cu. yd. H-70B PAYLOADER®

More Power: H-70 has more horsepower than the average of 9 competitive gas and diesel units.

More Dumping Clearance: The H-70 has 4" more clearance than average of 9 competitive units.

Safety Boom Arms: Underslung design keeps the operator safe from all moving members.

Safety Ladder: Makes access to the operator's compartment easy and safe. An H-70 **exclusive.**

"Full" Power-Shift Transmission: No manual shift from work to travel ranges. "PAYLOMATIC" transmission Hough designed and manufactured.

Four-Wheel-Brakes: Hydraulic, power-boosted four-wheel-brakes with separate parking brake. Front brakes sealed against dust and dirt.

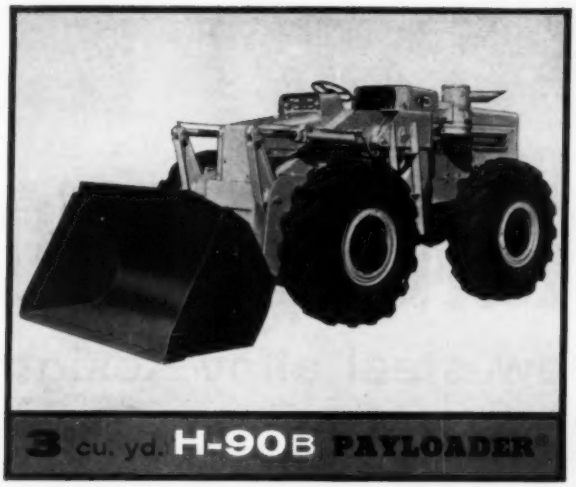
"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. A Hough "first".

Closed Hydraulic System: Sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type oil filter and fine-mesh screen.

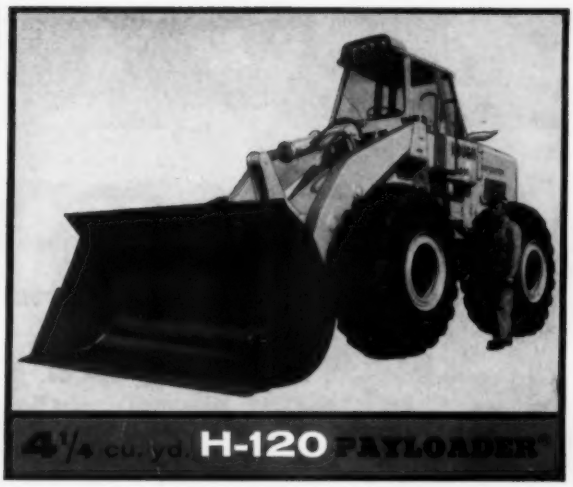
Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. An H-70 **exclusive.**

Torque-Proportioning Differentials: Transfer up to 24% more power to best traction wheels.

Easy Accessibility: Extra attention has been given to providing utmost accessibility to all service points.



3 cu. yd. H-90B PAYLOADER®



4¼ cu. yd. H-120 PAYLOADER®

More Power: H-90 has 24 more horsepower than the average of 8 competitive diesel models.

More Dumping Clearance: The H-90 has 10" more clearance than average of 8 competitive units.

Safety Boom Arms: Underslung design keeps the operator safe from all moving members.

Safety Ladder: Makes access to the operator's compartment easy and safe. An H-90 **exclusive.**

"Full" Power-Shift Transmission: No manual shift from work to travel ranges. Improved units have better operating characteristics.

Four-Wheel-Brakes: Power air brakes with big braking area on all four wheels assures easy, safe handling of the H-90 at all times.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. H-90 **exclusive.**

Closed Hydraulic System: Sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type oil filter and fine-mesh screen. Another H-90 **exclusive** protective feature.

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. An H-90 **exclusive.**

Torque-Proportioning Differentials: Transfers up to 24% more power to best traction wheels.

Easy Accessibility: Extra attention has been given to providing utmost accessibility to all points requiring checking and service.

Power-Steering: All "PAYLOADER" four-wheel-drive units have hydraulic power-steering.

More Power: H-120 has 38 more horsepower than next most powerful machine in this category.

More Dumping Clearance and Reach: H-120 has 4" more clearance, 6" more reach than next unit.

Safety Boom Arms: All moving members pivoted in **front** of operator. **Exclusive** on H-120.

Safety Ladder: Makes access to the operator's compartment easy and safe. Another **exclusive.**

"Full" Power-Shift Transmission: Hough-built, full-reversing, constant-mesh, countershaft-type with balanced rotating hydraulic clutches.

Four-Wheel-Brakes: Power air brakes with large braking area assure easy, safe handling at all times.

"Operator's Choice" Brake Pedals: Dual pedals give the operator a choice of braking with or without transmission engaged. H-120 **exclusive.**

Separate Oil-Cooling Radiator: A fan-cooled "oil-to-air" heat exchanger cools transmission and torque-converter oil. Another **exclusive.**

Better Balance: Exclusive use of lightweight, extra-strong "T-1" steel for box-section boom arms saves over a ton of "dead-weight" on the load-carrying end.

Better Stability: Counterweighted by approved use of dry ballast material in rear tires. Lower center of gravity, 50% of weight below rear axle. **Exclusive.**

Protection: Special dry-type air cleaner gives 99.8% dust removal efficiency under most adverse conditions. Sealed, pressure-controlled hydraulic system has cartridge oil filters and fine-mesh screens. **Exclusive.**

Extras: Canopy-type cab with windshield wipers and special lights is standard equipment.

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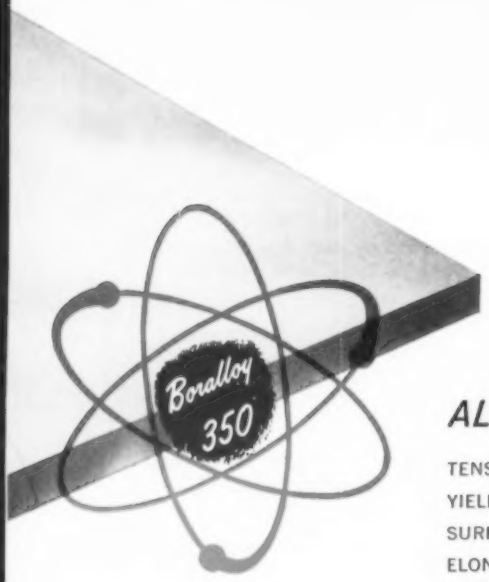
A SUPER STRENGTH ABRASION

a new steel alloy designed



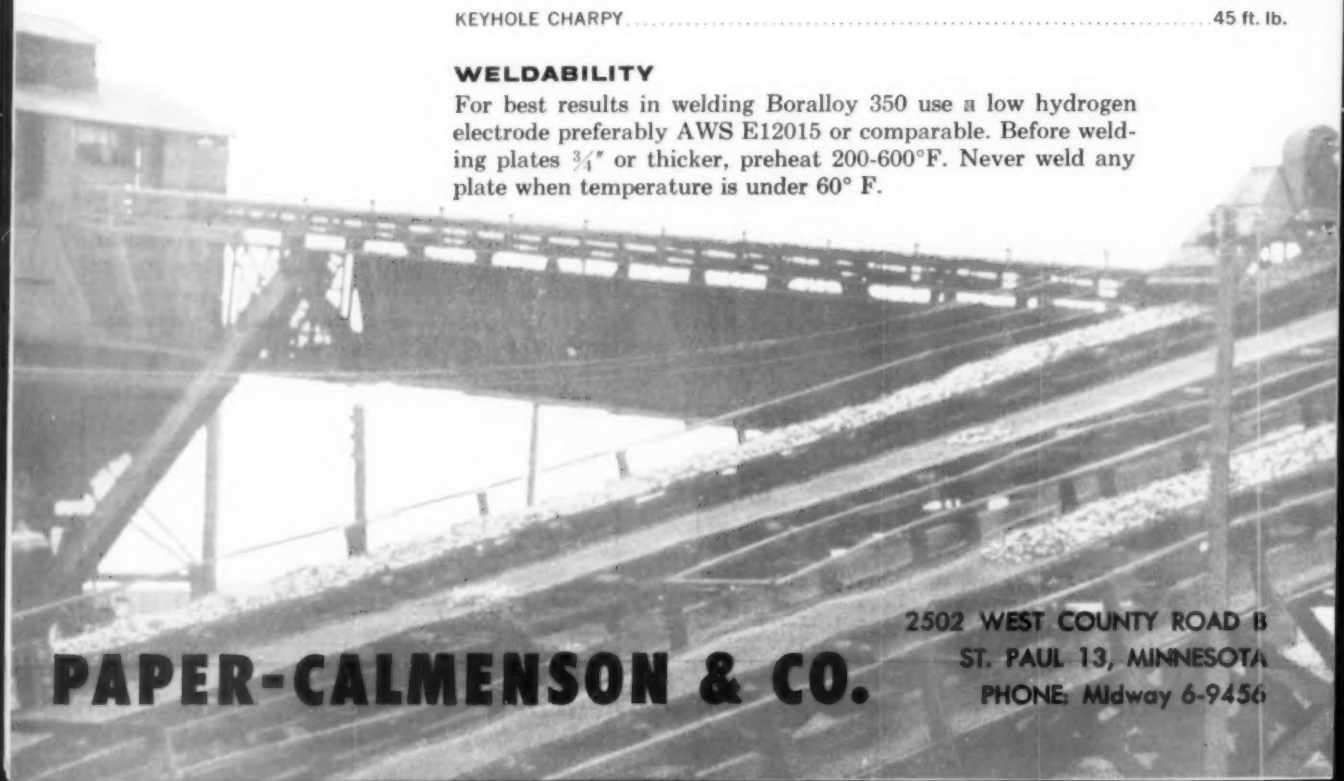
Pacal's new *Boralloy* 350 is made with Boron to achieve a Brinnel hardness of 350. Abrasion resistance is high, making new Boralloy an economical material for tortuous aggregate and ore application. Boralloy's superior structural strength requires less component weight and bulk and greatly increases length of use. Boralloy 350 plates are stocked only at Pacal and in sizes 3/16″ to 2″ thick, 36″ to 110″ wide and 10 ft. to 20 ft. in length.

ALLOY HEAT TREATED PLATE SPECIFICATIONS

TENSILE STRENGTH	150,000 psi. min.
YIELD STRENGTH	140,000 psi. min.
SURFACE HARDNESS BHN	364 min.
ELONGATION IN 2″	15% min.
REDUCTION IN AREA	55% min.
V NOTCH IZOD	87 ft. lb.
KEYHOLE CHARPY	45 ft. lb.

WELDABILITY

For best results in welding Boralloy 350 use a low hydrogen electrode preferably AWS E12015 or comparable. Before welding plates ¾″ or thicker, preheat 200-600°F. Never weld any plate when temperature is under 60° F.



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RESISTANT STEEL PLATE

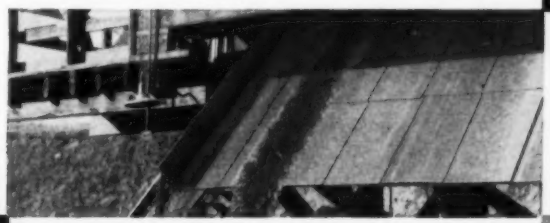
for longer life in tough jobs

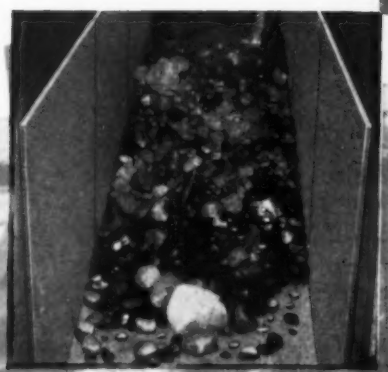
Boralloy 350 has a high tensile strength (150,000 psi) and resistance to shock.

Boralloy 350 resists corrosion and is equally serviceable in both wet and dry application.

Boralloy 350 can be drilled and machined with standard equipment by reducing speeds and using coolants.

Boralloy 350 welds normally in thicknesses of ½" and under, without stress-relieving. Thicker plates may be welded by preheating and stress-relieving.





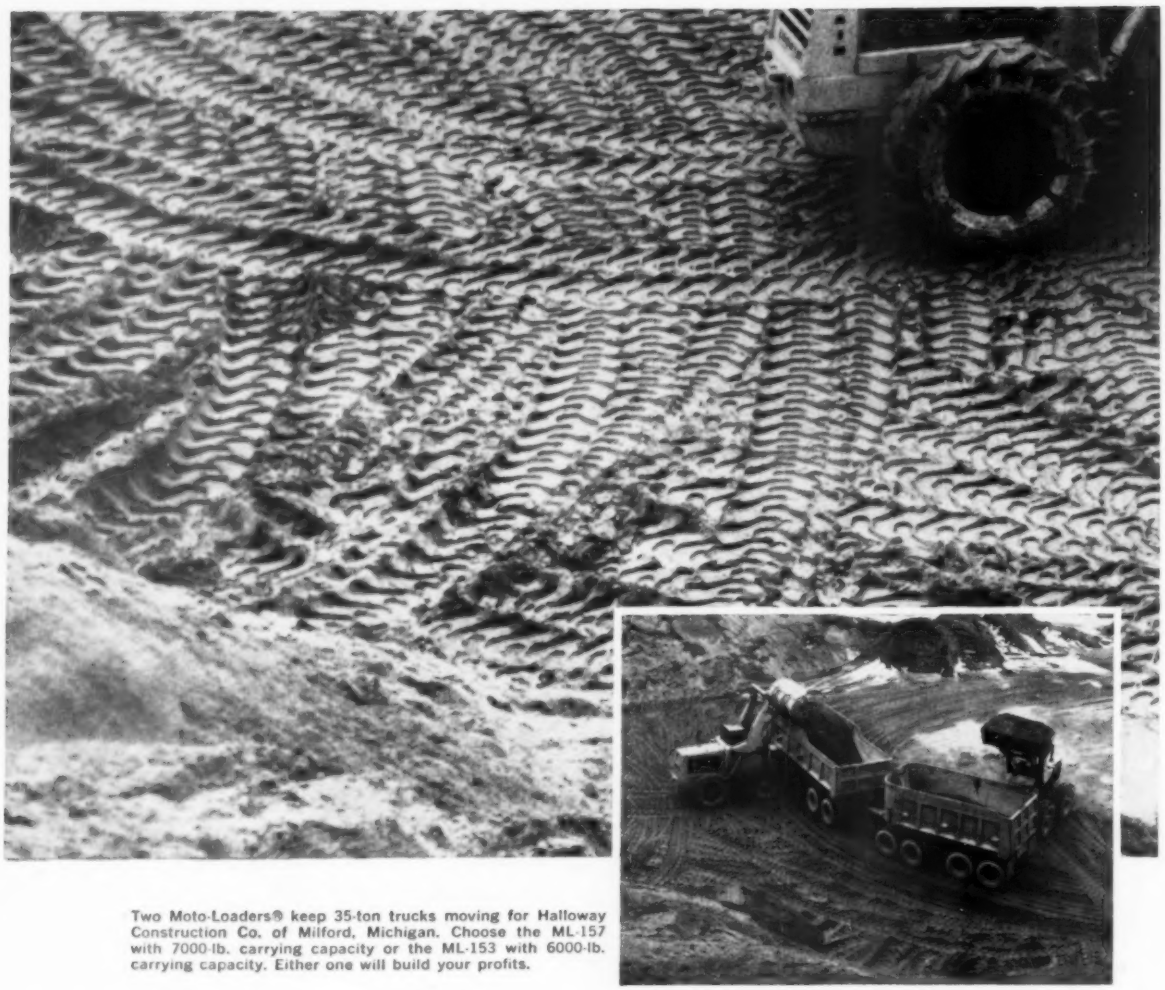
P&C

USES FOR BORALLOY 350:

- SCOOPS
- BUCKETS
- CHUTES
- TRUCKS
- CONVEYORS
- SCREENS
- BAFFLE PLATES
- HOPPERS
- BINS

Enter 18 on card, page 197

These tracks tell why Moto-Loader output is high



Two Moto-Loaders® keep 35-ton trucks moving for Halloway Construction Co. of Milford, Michigan. Choose the ML-157 with 7000-lb. carrying capacity or the ML-153 with 6000-lb. carrying capacity. Either one will build your profits.

NO JOCKEYING

You use just one foot to speed instantly forward or backward. Hands are free for power steering, finger-tip control of bucket and power shift transmission. Real control balance.

NO WHEEL SPINNING

Moto-Loader balanced power is just right for maximum digging, minimum costly wheel spin. Balanced too with hydraulic capacity so all functions flow together for maximum output.

FASTER MANEUVERABILITY

No bounce or teeter on rough ground. Balanced weight distribution does it. This also lets Moto-Loaders travel with load at optimum height to save dump time at the truck.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE

PLANTS: In Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS:** Power shovels, cranes, draglines, clamshells, and hoes on crawlers from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity . . . **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.

engine power
BY CATERPILLAR

FACTS ON REPOWERING WITH CAT ENGINES

Obsolescence has a way of creeping up almost unnoticed on equipment like industrial locomotives. One reason is that you buy equipment like this with long-term use in mind. So long as it performs reasonably well, an industrial locomotive seems ageless.

Yet, age does take its toll in efficiency. The locomotive needs more care and parts. It's slower on round trips. Down time occurs more frequently. It just isn't as reliable as it once was.

In some instances, the job grows beyond the locomotive's capacity. When the job is just slightly bigger than the engine, it's economically hard to warrant the cost of a new unit to get ahead. Many owners of industrial locomotives have found an answer to the age problem that's economically sound and sensible, too, from the production standpoint. They've simply repowered with Caterpillar Diesel Engines. For a modest investment—compared to costly maintenance or to buying a new locomotive—they now have locomotives that perform better than new.

A sand and gravel producer repowered a Plymouth locomotive with a Cat D337 and was able to do away with a steam locomotive he purchased from scrap to keep materials moving. The repowered 45-ton engine, reports the company, can break away and haul greater tonnage than the 60-ton steam locomotive. When the Plymouth had an air-operated clutch (direct drive), it was a major headache . . . big loads were clutching and declutching nightmares. Clutches wore out fast. Engine repairs were high and even the rails wore out rapidly. Efficiency was low.

In another instance, the owner of a 25-ton locomotive crane replaced a gasoline engine with a Caterpillar Diesel. This changeover has proved to be a very practical installation. Power and economy are good. In addition, the simplicity of the installation and the low cost of the changeover were added advantages gained by this owner.

Cat Diesels prove themselves in changeovers from every kind of power—including steam. A 15-ton locomotive crane, powered by steam, was changed to a Cat D315 with Torque Converter. The engine has more than ample power reserve for work—and the power is far smoother than that obtained with steam. The crane's work output shot up 33%—and the cost of diesel fuel is a small fraction of the cost of boiler fuel. And no fireman is needed with the diesel installation.

We could cite an almost endless list of examples. In each case, the equipment owner made the changeover on the basis of careful evaluation of every repowering aspect. In every case, Caterpillar Diesel Engines proved to be the best repowering investment. Post-installation performance justifies the choice down the line. Output goes up. Operating costs go down. Costly maintenance vanishes and dependability rises to new highs. And all of this comes with an investment that's only a fraction of that for purchasing new equipment to replace the entire unit.

When you think of repowering, be sure to have your Caterpillar Dealer give you his recommendations. He probably has repowered locomotives or cranes like yours. He can give you a clear idea of the cost and of the results you can expect. Probably, too, he can show you how to save a good deal of money. He has dependable Caterpillar Diesel Engines from 50 to over 700 HP, in a choice of many configurations. He is able to match the engine and transmission precisely to your need.

Send for "Caterpillar Engines for Railroad Power" and for "Railroad Equipment Manufacturer's Machines Powered by Cat Diesels." Each contains power data that can help you work out the best answer to your engine needs. Send for these today.

CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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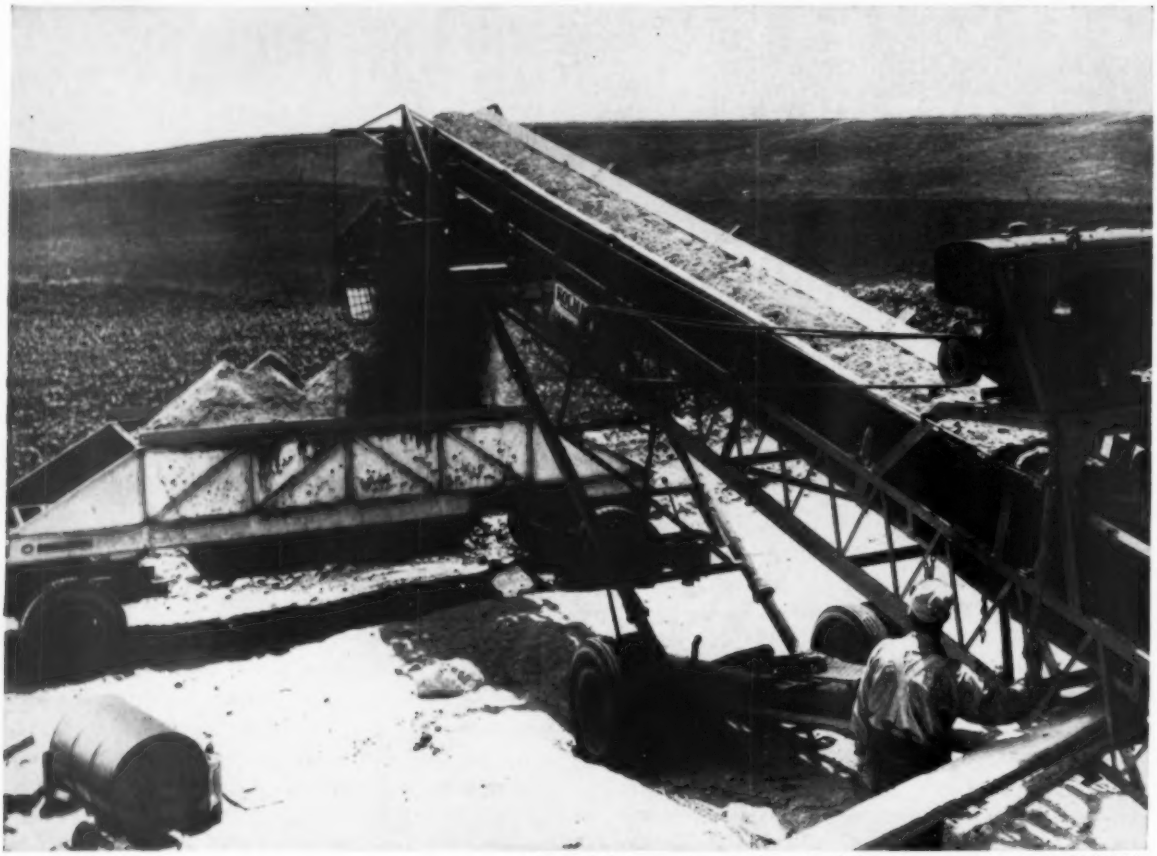
US RUBBER CONVEYOR BELTS



Stockpiled aggregates at crushing plant being conveyed into trucks via "U.S." Belt.

"No maintenance, no repairs, no downtime,"

SAYS CO-OWNER OF BIG CRUSHING PLANT

Mr. John Weelborg (of Weelborg Bros., Dell Rapids, S. D.) is co-owner of a firm engaged in crushing aggregates and in chip-surfacing roads.

The rock (dug from nearby pit) is bulldozed into stockpiles. 5-ply belts in widths of 36", 30", 24", 20" then carry the rock to the crusher for processing. These same belts carry crushed rock and sand to trucks for transportation to road-building sites.

"In the 20 months since these belts were installed," says Mr. Weelborg, "there has been no maintenance, no repairs, no downtime. *We couldn't ask for better belts.*"

• • •

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News of the Industry

1,500,000-Bbl. Plant Slated By Ideal Cement Company To Be First in N. Carolina

Wilmington, N. C., has been chosen as the site of North Carolina's first portland cement plant, which will be erected for Ideal Cement Company. Prime factor in the choice of Wilmington was said to have been the 30-ft. channel in the Northeast Cape Fear River.

Ideal officials indicated that the new multimillion-dollar facility will have a capacity of 1,500,000 bbl. per year, and that its output will eventually boost the total production of all Ideal plants to 38,500,000 bbl. annually. (Ideal operates portland cement plants in 15 other states and also in British Columbia.)

Marl from deposits in a 600-acre swampy area in Pender County, N. C., will be used as raw material. The tract is owned by the Volunteer Portland Cement Company, Knoxville, Tenn. (Volunteer joined the Ideal organization last year.)

It was announced that a distribution facility will be built at Fayetteville, N. C., to handle that portion of the output of the new plant which will be hauled by barges up the Fear River.

Construction is slated to begin at Wilmington late this year, according to Cris Dobbins, chairman and president of Ideal.

Marquette's Superior Plant To Be Revamped by 1961

The directors of Marquette Cement Company have authorized capital expenditures totaling more than $7,500,000 for improvements and replacement of several plants. The major project approved covers the cost of completing the modernization program initiated at the Superior, Ohio, plant several years ago. This program will be completed in 1961.

For better foundation conditions, Marquette is moving the site of the plant to a rock shelf about 1,000 ft. from the present site. This location shortens the raw material conveying system from 2,317 ft. to 870 ft.

Annual production capacity will remain at the present 1,250,000 bbl., but the new improvements will reduce production costs by about one-third.

Included in the new installation will be a covered craneway for raw material, coal, and clinker storage, a raw-grinding department with 9½ x 15 ft. grinding mills, raw mix and blending silos, a 425-ft. kiln, clinker storage silos, and a finish-grinding department featuring an 11 x 32 ft. finish-grinding mill. With some relatively minor modifications, annual output of the plant can be stepped up by 150,000 bbl.

Construction Under Way On Big Automated Plant Of Natl. Gypsum in Florida

National Gypsum Company has begun construction on a $6,000,000 new gypsum products plant at Port Tampa, Fla. Designed as a fully-automated operation, the plant will be similar to the firm's new plants at Lorain, Ohio, Waukegan, Ill., and New Orleans.

Gypsum ore will be supplied by ship from National's Nova Scotia gypsum deposits. The firm presently has three large ocean-going bulk gypsum carriers which transport the ore from the Nova Scotia quarries to its six Atlantic and Gulf Coast plants.

National has been supplying the Florida market from its recently expanded plant at Savannah, Ga.

Coming Events

June 13-14, 1960 — Chicago. Board of directors meeting, National Limestone Institute, Inc. Edgewater Beach Hotel.

June 26-July 1, 1960 — Atlantic City. 63rd annual meeting and apparatus exhibit, American Society for Testing Materials. Chalfonte-Haddon Hall.

July 17-20, 1960 — Kiamesha Lake, N.Y. Midyear meeting, National Bituminous Concrete Association. Concord Hotel.

July 20-23, 1960—White Sulphur Springs, W. Va. Midyear meeting, N.C.S.A. board of directors. The Greenbrier.

October 3-5, 1960—Pebble Beach, Calif. Semi-annual meeting, National Sand and Gravel Association board of directors. Del Monte Lodge.

October 10-13, 1960 — Las Vegas, Nev. Metal Mining and Industrial Minerals Convention Exposition, American Mining Congress.

October 17-21, 1960—Chicago. 48th Annual National Safety Congress, National Safety Council.

November 3-4, 1960—Washington, D. C. Annual meeting, National Slag Association, Hotel Mayflower.

March Building Awards Show 9 Percent Drop But Dodge Index Rises

March future construction contracts in the United States (excluding Alaska and Hawaii) totaled $3,046,345,000—down 9 percent from the same month last year. This is the eighth consecutive month showing a drop in award totals, compared to the same months in 1959. However, March figures showed some improvement over the two previous 1960 months.

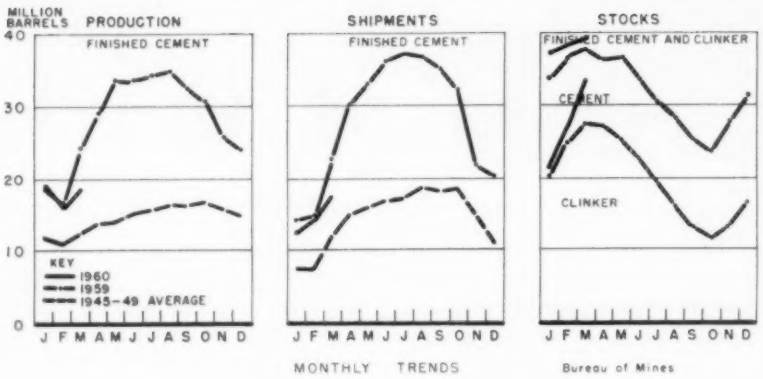
Contracts for highways and nonresidential building construction were up sharply, F. W. Dodge Corporation reported, but these gains were more than offset by declines in most other construction categories. An optimistic fact—the Dodge Index rose to 252 from a level of 234 in February and 235 in January (1947 to 1949 = 100).

ITEM: housing contracts amounted to $1,293,607,000—down 16 percent from March, 1959.

ITEM: heavy engineering contracts amounted to $685,278,000—falling 23 percent from March, 1959, despite a sharp gain in highway contracts.

ITEM: non-residential building contracts totaled $1,067,460,000—up 17 percent. Sharp gains were registered for factories, schools, and public buildings.

CUMULATIVE TOTALS for the first three months of 1960 and the percentage changes from the corresponding period of last year: total construction, down 6 percent to $7,457,691,000; housing, down 12 percent to $3,199,669,000; non-residential building, up 5 percent to $2,557,957,000; and heavy engineering, down 10 percent to $1,700,065,000.



—March, 1960, Finished Portland Cement—

SUMMARY—Production of finished portland cement in March, 1960, as reported to the U. S. Bureau of Mines, totaled 18,422,000 barrels—a decrease of 24 percent compared with March, 1959. Mill shipments totaled 17,681,000 barrels—a decrease of 23 percent compared with March, 1959. Stocks of 39,163,000 barrels of finished portland cement on hand March 31, 1960, were 8 percent higher than those on hand March 31, 1959. Clinker production during March, 1960, totaled 24,520,000 barrels—a decrease of 9 percent compared with March, 1959.

PRODUCTION—One hundred and sixty-one (161) plants in 37 states and Puerto Rico reported a production of 18,422,000 barrels of finished portland cement during March, 1960, compared with 24,337,000 barrels produced in March, 1959.

Production of clinker was 24,520,000 barrels, compared with 26,976,000 barrels during the same month last year.

High-early-strength portland cement totaled 1,245,000 barrels—an increase of 24 percent over the March, 1959, production.

Prepared masonry cement production of 896,000 barrels decreased 30 percent from the March, 1959, figure.

SHIPMENTS—Mill shipments of finished portland cement for March, 1960, were reported by one hundred and seventy-one (171) plants and totaled 17,681,000 barrels—compared with 23,027,000 barrels in March, 1959.

Shipments were higher in only 3 districts and lower in 20 districts. Increased shipments in 2 districts (New York-Maine and Colorado-Arizona-Utah-New Mexico) were in large part due to new plants in these districts.

Mill shipments of high-early-strength portland cement totaled 1,005,000 barrels—a decrease of 10 percent from the 1,111,000 barrels shipped in March, 1959.

Mill shipments of prepared masonry totaled 834,000 barrels—a decrease of 36 percent from the 1,302,000 barrels shipped in March, 1959. Seventy-four percent of these shipments were from mills east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 39,163,000 barrels of finished portland cement were on hand March 31, 1960—an increase of 8 percent over the 36,381,000 barrels on hand March 31, 1959. Stocks of clinker on hand March 31, 1960, totaled 33,450,000 barrels—an increase of 22 percent over the 27,371,000 barrels on hand March 31, 1959.

FIRST THREE MONTHS OF 1960—For the January-March period, the volume of production of finished cement amounted to 53,171,000 barrels, compared with 59,651,000 barrels (revised figure) in the comparable period of 1959. Total shipments for the first three months of 1960 are reported at 45,023,000 barrels; in the same period of 1959 total shipments were 52,228,000 barrels (revised figure). (Shipments figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: March, 1959—239,000 barrels; January-March, 1959—525,000 barrels; March, 1960—131,000 barrels; January-March, 1960—396,000 barrels.) ●

Clute Corp. Asbestos Mine Proved Largest Deposit in U. S.

Clute Corporation's mine near Lake Berryessa, Calif., contains the largest reserve of asbestos ore in the United States, according to a geological survey just completed for the Denver-based company. The survey indicated 3,942,000 tons of proved possible ore reserves. The ore lies close to the surface and is being mined by the open-pit method. The only other commercial asbestos in the U.S. is located in Vermont.

Construction of a new 1,000-t.p.d. mill is now underway at the mine site, and first major production of asbestos fiber is expected in August of this year. The mill is being constructed in four units, each with a capacity of 250 t.p.d.

Ore will be processed by a new dry-milling method using air pressure for movement, separation, and classification of the products. For the last year ore has been milled on the property in an air separation pilot plant especially designed by the Clute Manufacturing Division for Asbestos Bonding Corporation, a wholly-owned Clute subsidiary which holds the mining claims to the site.

Flintkote Lime Operation To Be Opened in Utah

The Flintkote Company is about to go into production at Dolomite, Utah, using the Corson-patented lime hydration process.

This is the tenth plant operating under G.&W.H. Corson, Inc., patents. An eleventh plant, to be built in Australia, is being designed.

Enter 25 on card, page 197 →

This Eagle Log Washer is a "Champ"

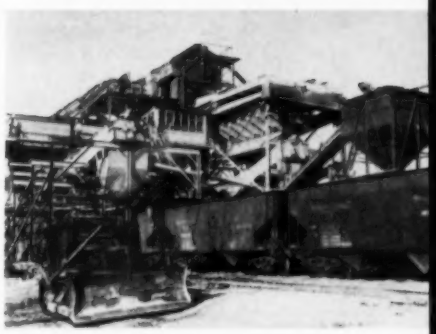
At Jahncke Service, Inc., In Louisiana It's Winning Battle Against Clay Balls

For years this firm has been a leading supplier of building materials in New Orleans.

To insure their customers of good, clean gravel they installed an Eagle 36" x 30' Log Washer at their Bluff Creek, La., plant. This log washer is doing a commendable job of breaking up clay balls. The replaceable corrugated Ni-Hard paddles also abrade the gravel scouring it clean. Clay, mud and sticks are washed up and overboard by the powerful water currents rising from a manifold on the bottom of the tub.

The Eagle Log Washer is a product of Eagle's long experience—evident are such features as the Ni-Hard 2-piece renewable paddle shoes (only the top half need be replaced when worn), the non-deflecting tubular steel log shafts and the totally enclosed oil-bath gear drive.

The sand washing-classifying-dehydrating section at Jahncke's plant includes an Eagle 32' double Water Scalping-Classifying Tank with 3-cell Collecting-Blending Flume and a double screw and single screw 36"



x 25' Fine Material Washer-Classifier-Dehydrator which are likewise performing satisfactorily. Learn what Eagle Equipment can do for you—send for catalog.

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Rumford Named President Of Dragon Cement Div., Succeeding Ackerman

Lewis Rumford II has been appointed to the presidency of Dragon Cement Company Division of American-Marietta Company.

Mr. Rumford, who is president of A-M's Baltimore-based Standard Lime and Cement Company Division, succeeds James H. Ackerman, who is retiring from the active management of Dragon. However, Mr. Ackerman will continue as a director of American-Marietta.

No changes are contemplated in Dragon's marketing policies, customer service, products, brands, or company identity.

A-M's four cement divisions are Standard Lime and Cement Company, Dragon Cement Company, Southern Cement Company, and Dewey Portland Cement Company.

Dragon Cement Company Division (American-Marietta Company) recently installed a new president—Lewis Rumford II. He succeeds James H. Ackerman, left, who is retiring.

Construction Starts on Plant Of Big Horn Gypsum at Cody

Construction of the Big Horn Gypsum Company's $3,000,000 gypsum board plant at Cody, Wyoming, is to begin at once, according to Sid H. Eliason, president of the firm. Engineering has been completed, and machinery is on order. Operation of the plant is scheduled to begin by January 1, 1961.

It was announced that Big Horn will acquire the 41,000,000-ton Taggart gypsum deposit near Cody, which reportedly will furnish raw material for the production of 100,000,000 board feet of wall board annually.

Officers of the company, in addition to Mr. Eliason, are E. L. Hildebrand, vice-president; Sid H. Eliason Jr., treasurer; and Max B. Lewis, secretary. W. C. Headlee has been named works manager at Cody.

Williams and Peterson Construction Company, Salt Lake City, are the general contractors; and Johnson & Johnson of Chicago are the architects.

Lime Sales in February, 1960

Lime sold and used in February, 1960 (981,898 short tons), increased over the previous month's output, according to reports sent by producers to the Bureau of Mines, U. S. Department of Interior.

Agricultural and chemical and other industrial lime increased, whereas decreases were noted in construction and refractory lime.

Lime Sold and Used by Producers* in the United States, in Specified Periods of 1959-60, by Types and Major Uses in Short Tons

	January	February		January-February	
	1960	1960	1959	1960	1959
By types:					
Quicklime	777,189	787,733	575,161	1,564,922	1,145,084
Hydrated lime	196,470	194,165	138,332	390,635	270,992
Total lime	973,659	981,898	713,493	1,955,557	1,416,076
By uses:					
Agricultural:					
Quicklime	2,198	2,213	3,045	4,411	6,104
Hydrated lime	4,170	5,446	7,427	9,616	11,573
Total	6,368	7,659	10,472	14,027	17,677
Construction:					
Quicklime	6,604	6,189	10,494	12,793	21,973
Hydrated lime	61,303	60,806	58,797	122,109	115,330
Total	67,907	66,995	69,291	134,902	137,303
Chemical and other industrial:					
Quicklime	539,447	556,147	363,335	1,095,594	729,818
Hydrated lime	130,997	127,913	72,108	258,910	144,089
Total	670,444	684,060	435,443	1,354,504	873,907
Refractory (dead-burned dolomite)	228,940	223,184	198,287	452,124	387,189

*The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

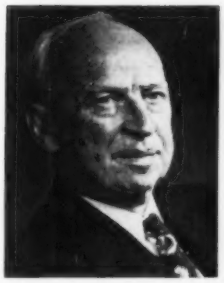
Four Aggregate Plants Merged into Canton Aggr. Co.

Central States Construction Company, Willmar, Minn., has taken over the management and operation of newly-acquired concrete and bituminous aggregate production plants at Canton, Ohio.

This group of corporations will merge under the name of Canton Aggregate Company. Previously these firms had been operated individually as Stark Sand and Gravel Company, Canton Sand and Gravel Company, Lake Cable Sand and Gravel Company, and United Sand and Gravel Company.

The joint venture sponsoring this new concern is made up of Central States Construction Company, New London Materials and Construction Company, and Willmar Ready-Mix Co.

General Crushed Stone Company, Easton, Pa., has bought The J. E. Baker Company, Verdon, Va.



Graham J. Morgan, right, new president of U. S. Gypsum Company, succeeds Oliver M. Knode, who is retiring from the post which he held for 16 years. (See accompanying story.)

Morgan Named President Of U. S. Gypsum Co.— Oliver M. Knode Retires

Graham J. Morgan has been elected president of United States Gypsum Company, succeeding Oliver M. Knode, who is retiring after serving as president for 16 years.

Mr. Morgan joined the firm in Minneapolis in 1939. He spent 10 years in sales, and then served successively as vice-president of merchandising and later as assistant to the chairman of the board. He became executive vice-president in May, 1959.

The retiring president, Mr. Knode, has been active in U. S. Gypsum affairs since its founding in 1902. He began his career in 1897 at a small gypsum mine and manufacturing plant in Oakfield, N. Y., which later became a part of U. S. Gypsum. He was named executive vice-president in 1931 and president in 1936. He retired as president in 1942, but returned in 1949 to resume the position.

Hoy, Material Service President, Named Gen. Dynamics Officer

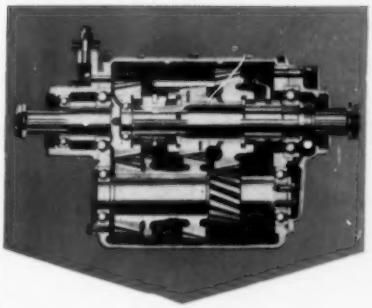
Patrick H. Hoy, who was recently named president of Material Service Division of General Dynamics Corporation, has been elected a senior vice-president of the parent firm. He will continue as president of the Chicago-based division.

Patrick H. Hoy

Mr. Hoy had an early start in the field of management, having served as assistant and sales manager for Commander Larabee Company of Minneapolis at the age of 18, and subsequently sales manager. At 25 he became a director, vice-president, and general manager of the Amber Milling Company, Minneapolis.

After service during World War II he was affiliated with the Sherman and Ambassador hotels in Chicago, becoming president and chief executive officer of the group in 1954. He is presently a director of Union Asbestos and Rubber Company of Chicago and National Management Ltd. of Montreal.

Texas Portland Cement Company's plant near Echo, La., set an all-time production record during March, having produced about 60,000 bbl. of cement and sold 66,000 bbl. The sales total for the month amounted to $250,334.



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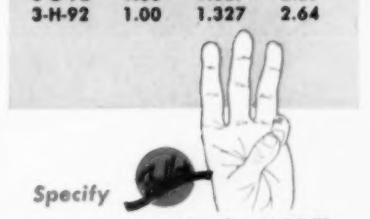
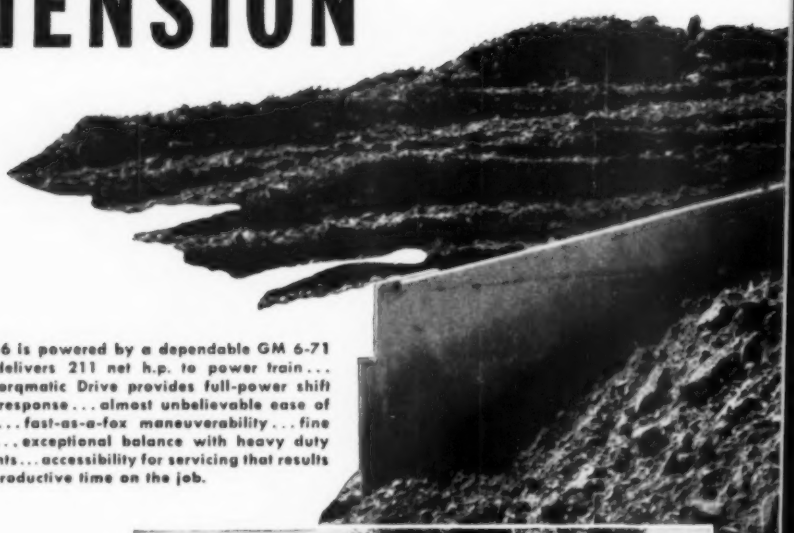
3-C-92	.75	1.00	2.64
3-D-92	.75	1.00	1.24
3-E-92	.84	1.00	2.09
3-F-92	.84	1.00	2.64
3-G-92	1.00	1.327	2.09
3-H-92	1.00	1.327	2.64



FULLER MANUFACTURING COMPANY
(Transmission Division)
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Enter 27 on card, page 197

EUCLID'S GREATER DIMENSION



Model C-6 is powered by a dependable GM 6-71 engine; delivers 211 net h.p. to power train . . . proven Torqmatic Drive provides full-power shift and fast response . . . almost unbelievable ease of handling . . . fast-as-a-fox maneuverability . . . fine visibility . . . exceptional balance with heavy duty attachments . . . accessibility for servicing that results in more productive time on the job.

The C-6 has the speed, power and maneuverability to handle every kind of tractor job . . . ripping, dozing, push loading, clearing, towing and other heavy work. Many major components including Torqmatic Drive, engine, and planetary drive axle have been job proved in thousands of Euclid earth-movers. Owners say that full-power shift, easy operation and fast response give the C-6 more work-ability than any other crawler in the 200 h.p. class.

Facts and figures on the Model C-6 and Model TC-12 "Eucs" are available from the Euclid dealer in your area . . . get in touch with him soon!

Greater Dimension in power and performance . . . TC-12 has 2 engines that deliver a total of 425 net h.p. . . . independent track drive with separate power train and Torqmatic Drive for each track . . . full-power shift and instantaneous reverse . . . 8 track rollers . . . unequalled accessibility for servicing . . . maneuverability and workability that have set new standards of big tractor performance.

Proven Torqmatic Drives deliver a smooth flow of power to each track . . . with full-power shift there's no delay for clutching and shifting . . . change direction with a flick of the wrist . . . 425 total net h.p. is automatically matched to every job requirement . . . rigid track alignment maintained by independently suspended track frames and final drives . . . years-ahead engineering reduces downtime and maintenance costs for a better return on investment.

Crawlers without full-power shift are obsolete . . . and costly!

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Enter 28 on card, page 197

IN MODERN CRAWLER DESIGN

With over twenty-five years of experience in building heavy earth-moving equipment exclusively, Euclid offers a greater range of types and capacities, a greater background of field experience, and a greater return on your equipment investment.

One example of this greater dimension was the introduction of the Model TC-12 Crawler over 5 years ago. Here was an entirely new concept of tractor design . . . two engines, each driving a separate track through its own Torqmatic Drive . . . unequalled power and work-ability . . . performance that set a new standard of crawler productivity . . . ease of operation and servicing that is still unsurpassed in the industry.

Recently the Model C-6 Euclid tractor went into production after the most comprehensive field trials and proving ground testing ever given any new Euclid model. It, too, has Torqmatic Drive and full-power shift as well as many of the advanced design features of the bigger TC-12. And like the "Twin", the new C-6 utilizes major components that have been job proved in thousands of "Eucs" in construction, mine and quarry service. For instance, the Allison converter and semi-automatic transmission "package" has long since passed the pioneering and development stage . . . it's been used in "Euc" scrapers, rear-dump haulers and other models for years. These two Euclid crawlers provide so much more work-ability that they obsolete tractors without the operating advantages of full-power shift.

EUCLID Division of General Motors • Cleveland 17, Ohio

• President Eisenhower is here inspecting a scale model of "the world's largest mobile land machine" a 3850-B Bucyrus-Erie stripping shovel in process of construction at the firm's South Milwaukee, Wis., plant. It will be used at the Peabody Coal Company's new mine in western Kentucky. Presenting the model to the President are F. Stillman Elfred (right), chairman of the board of the National Coal Association, and Stephen F. Dunn, N.C.A. president. The 115-yd. dipper of the giant shovel will pick up 173 tons of material at a single pass.

Dewey Earmarks $1,000,000 For Dust Collectors at Tulsa

Dewey Portland Cement Company, a division of American-Marietta Company, will spend $1,000,000 to install dust collectors at its new $12,000,000 plant now under construction at Tulsa, Okla. The equipment will cost about $400,000, and installation and wiring will bring the total expenditure to $1,000,000.

Work on this plant was started in April, 1959, and the 1,250,000-bbl. capacity plant will be in production this summer. Blasting has been begun to open the quarry.

A-M Continues Acquisitions — Buys Fry Coal & Stone Co.

American-Marietta Company has acquired Fry Coal and Stone Company, Mercersburg, Pa., for an undisclosed amount of stock. The acquisition includes Garbart Construction Company and Vesco Corporation, two firms associated with Fry.

The new A-M division is a producer of concrete aggregates, road stone, bituminous aggregates for highway and road construction, and coal, with operations at eight quarries and processing plants in Pennsylvania, Maryland, and West Virginia. Total sales during 1959 amounted to about $6.5 million.

Leonard S. Fry, founder and president, will continue to manage the Fry division.

Ideal Cement's Tijeras Plant Wins "Top Ten Plants" Award

The Tijeras, N. M., plant of Ideal Cement Company has been selected as one of the top ten plants built in the nation during 1959, from those of 500 industrial firms. The selections were made by the staff of the business journal *Factory*.

In issuing the citation, the judges said that the new plant "argues well for broader use of the firm's product in industrial construction. Its advanced instrumentation and cleanliness make it an industry and community leader."

The selection by *Factory's* staff from nominations by architects, engineers, and readers throughout the nation was based on a number of standards—adaptability to changes in production methods; provision for growth and expansion; electrical facilities; employee facilities and services; superior maintenance; and appearance of buildings and grounds.

Construction Put in Place Rises 8 Percent in April But Drops from '59 Rate

The value of new construction put in place in April amounted to $4 billion, according to preliminary estimates of the U. S. Department of Commerce. This figure was 8 percent above March but 6 percent less than the total in April, 1959.

ITEMS: private construction, estimated at $2.9 billion, was up 4 percent from March, but 5 percent below April, 1959. Residential was valued at $1.5 billion—up 5 percent—but 15 percent less than in April, 1959. A decline from March to April, 1960, of nearly 5 percent in the annual rate of private residential construction (from $21.0 to $20.0 billion) accounted for the decrease in the annual rate of private construction.

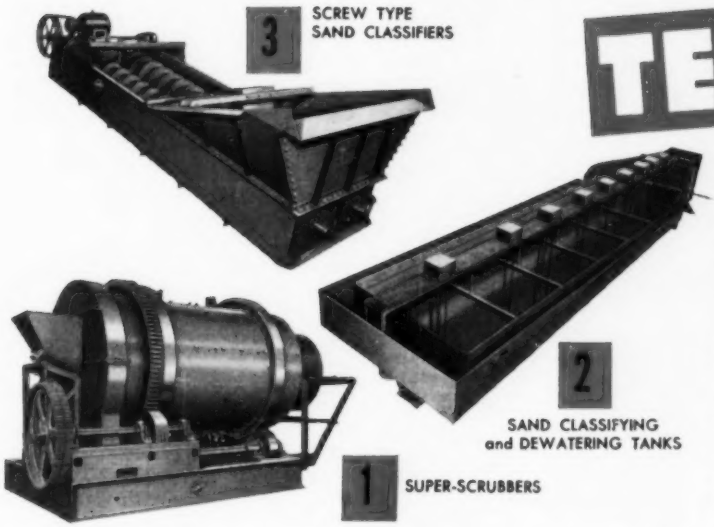
ITEMS: public construction, estimated at $1.2 billion, was up 20 percent from March. The change was about normal for this period. For most categories, spending in April was less than in April of last year, accounting for a decline of about 10 percent in total public construction. The major declines in spending to date have been in construction of highways, public residential buildings, and military facilities.

CUMULATIVE TOTAL for the first four months is $14.9 billion—down 3 percent from the same period last year. The seasonally-adjusted annual rate of total construction expenditures is now $52.4 billion, about 2 percent below the $52.9 billion rate in March.

The National Limestone Institute has moved to new and larger quarters. The new Washington address is 210 H Street, N.W., Washington 1, D. C. The institute now has 4,000 sq. ft. of air conditioned office space.

Columbia Cement Corporation, a wholly-owned subsidiary of Columbia-Southern Chemical Corporation, will transfer its general sales offices from Zanesville to Columbus, Ohio, where a new headquarters building is under construction.

MEETS DIFFICULT SPECS



TELSMITH® Equipment

for SCRUBBING • WASHING • CLASSIFYING

You can produce clean, properly graded aggregates to meet even *the most exacting specifications*, but it takes the most modern and most efficient machinery. That means *Telsmith* equipment—Super-Scrubbers, Washing Screens, Sand and Gravel Rewashers, Sand Dewatering and Classifying Tanks, Screw Type Sand Classifiers—get Bulletin 292.

Typical Scrubbing, Washing, Screening and Sand Classifying Tower

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SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Songworks, Milwaukee

Retiring board of directors, Kentucky Crushed Stone Association. Standing (left to right): W. O. Snyder, re-elected executive secretary; Will Ed Covington; Martin T. Smith; Frank Hamilton; and Powell Potts. Seated (left to right): W. B. Paynter Jr., new first vice-president; W. D. Milne, newly-elected president; Miss Margaret McD. Smith, re-elected treasurer; Richard Cooper; and Norman Wiedmer.

Kentucky Stone Producers Discuss Industry Problems

W. D. MILNE, Kentucky Stone Company was elected president of the Kentucky Crushed Stone Association at the annual convention of that organization held at the Kentucky Hotel in Louisville, April 8 and 9.

W. B. Paynter Jr. was chosen first vice-president; Norman Wiedmer was elected second vice-president; Margaret McD. Smith was re-elected treasurer; and W. O. Snyder was again chosen executive secretary.

Directors elected at the annual business meeting include Tom Ballard, Frank Hamilton, W. R. Harrod, David McLellan, W. L. Osborne Jr., and Powell Potts. Richard E. Cooper, as retiring president, became an *ex officio* member of the board.

During the general meeting of the convention, Joe E. Gray, engineering director of the National Crushed Stone Association, presented data on the use of local sub-base materials, pointing out that these materials vary greatly in quality and that the present A.S.T.M. and Kentucky specifications leave the requirements wide open for acceptance of almost any granular material. He says tests should be of a nature that would ensure quality giving satisfactory performance.

Many pavement failures have been reported because of the poor character of material used in the sub-base, Mr. Gray said, adding that 15 states report trouble with limestone and 11 with sandstone.

There was a decrease in the amount of agricultural limestone used in Kentucky during 1959, according to a report made to the convention by Charles H. Allen, program specialist, United States Department of Agriculture. He expressed some concern at this trend, considering soil requirements calling for much greater usage of limestone.

In urging increased use of aglime, Mr. Allen urged producers to work closely with county agents, vocational agricultural instructors, and county ASC groups. He also recommended continued use of advertising in local newspapers and more widespread use of the purchase order system.

Sam Omasta, vice-president of the National Limestone Institute, expressed the opinion that there is no possibility that ACP would be reduced under the present $250,000,000 appropriation. He predicted that the existing soil bank would be discontinued, and that there would be no Congressional action on percentage depletion allowances this year. Mr. Omasta also predicted that there would be no major highway legislation this year, since Congress is now awaiting revised cost estimates, the findings on the Illinois Test Road, and a report on usage taxes.

Of prime interest and concern was a presentation of sales tax regulations as they affect crushed limestone producers. This was presented by William E. Scent, Kentucky commissioner of revenue. He said that the sales tax becomes effective July 1, 1960. It does not apply to public works contracts executed prior to February 6, 1960, nor to deliveries made prior to July 1.

U.S. Gypsum Begins Construction Of Mexican Crushing Operation

United States Gypsum Company has begun construction at La Borreguita (east central San Luis Potosi state), Mexico, on a crushing plant and a small village of approximately 25 single dwelling units. Present plans call for a completion date early this fall, so that operation of the quarry and shipment of crushed gypsum can begin before the end of 1960.

Deposits are either exposed on the surface or below a shallow overburden. Crusher-run gypsum ore will be rail-shipped to the Port of Tampico for stockpiling and further shipment to U. S. Gypsum plants at New Orleans, La., and Galena Park, Tex.

Paving Application Considered For Short-Fiber Asbestos

A possible major market for Group 7 asbestos fibers in road paving has been discovered in Canada. Known in the trade as "shorts" or "refuse," the Group 7 fibers are worth only $44 to $75 per ton, compared with $1,480 per ton for high-grade, long-spinning fibers.

This possible market is good news for Canada's asbestos industry. For example, about 75 percent of the Johns-Manville mine output is in the Group 7 class. The potential new market for short-fibered asbestos for road surfaces is estimated at 500,000 tons per year, according to C. B. Burnett, president.

Enter 33 on card, page 197 →

430 h.p.

350 h.p.

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nstruction machines!

/ 8.3

NEW from Cummins!
Only from Cummins!

The first V diesels of their size and h.p. built from the pan up for co

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V8-430

Cummins has done it again! Built two V diesels in the much needed 350-430 horsepower class especially for construction machines. This opens a new world of *Cummins Diesel economy* for big scrapers, off-highway trucks, shovels, front end loaders and other equipment where there has been a demand for compact yet large bore, big displacement engines.

The 350 h.p. and the 430 h.p. V8 engines are construction diesels from front to back, top to bottom. Every kind of application—every operating condition was considered in their design. The V8's represent the *most advanced* thinking in construction power on the market today! New features, major improvements combined with Cummins proven basic design makes them the most profitable source of power you can own or operate! And here's why...

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INTERNATIONAL SALES & SERVICE — CUMMINS DIESEL INTERNATIONAL LTD., NASSAU, BAHAMAS — CABLE: CUMNAS
OVERSEAS FACTORY — CUMMINS ENGINE COMPANY LTD. — SHOTTS, LANARKSHIRE, SCOTLAND

Litho in U.S.A. — MP-60

THE DIESEL
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430 horsepowe
displacement!
Put these fac
Cummins VT8
that's as much
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give you the
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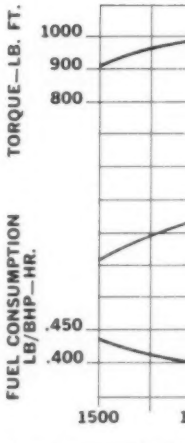

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ENGINES WITH *4 MORE CYLINDERS!*

ver! 990 ft. lbs. peak torque! 950 cubic inch
! 7 lbs. per h.p.! Less than 59 inches long!
acts together and you have the rugged
8-430 TURBODIESEL® Engine—the diesel
eh as 40% smaller and more compact than
rrent use delivering equal power.

very concept, the VT8-430 was designed to
benefits of turbocharging. Not only does
; pack more power into the engine, but it
ted horsepower up to 10,000 feet. Cummins
e developed a lightweight, perfectly-balanced
that gives fast acceleration—trouble-free
Further, the VT8 operates at low exhaust
assuring long life for both the engine and

puts the accessories on top of the block, in
d by the cylinder banks. This means greater
easier maintenance, less costly repairs. In-
nsert-type injectors are much easier to install
Vet-type liners require less time to remove,
nstall. These are only few of the many
this new Cummins Construction Diesel.
the VT8-430 gives you a combination of
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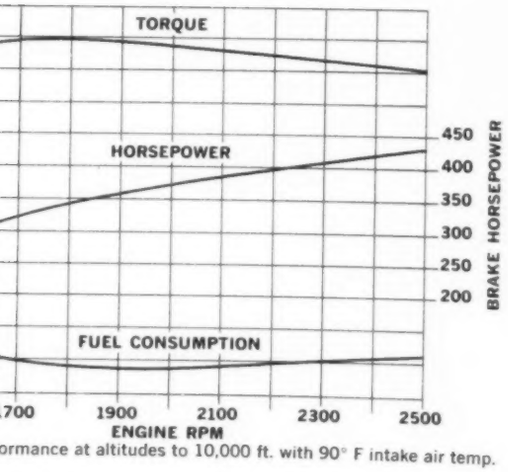
s well as a lower initial investment than the
in its power class. You can't beat this
ny!

VT8-430 PERFORMANCE CURVES



ormance at altitudes to 10,000 ft. with 90° F intake air temp.

V8-350

NEVER BEFORE, SO MUCH POWER FROM SUCH A COMPACT, NATURALLY-ASPIRATED DIESEL!

Here's rugged construction power! 805 ft. lbs. peak torque —*naturally!* (See curves below.) Like the VT8, this engine has a piston displacement of 950 cubic inches and rotates at 2500 rpm. This produces 350 horsepower in a package that's less than 57 inches long.

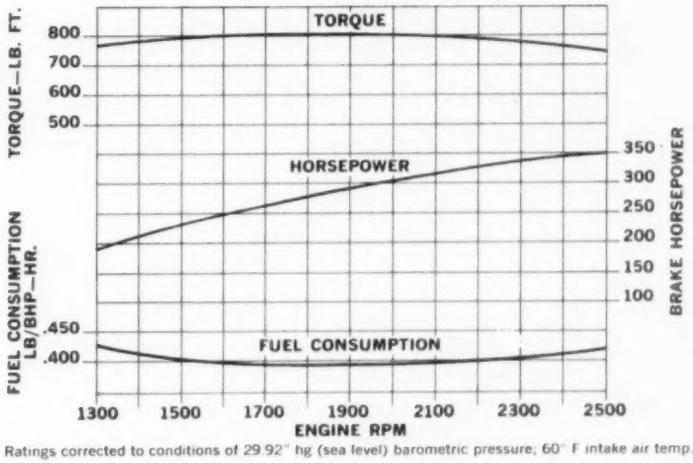
The V8-350 has many new features to reduce operating costs. New internal fuel and oil lines eliminate threaded connections, damage to exposed lines. Cummins own 12 cfm air compressor is supplied on both engines. Of simple, one cylinder design, here is the only unit in the trade backed by a 3600 hour or one year warranty.

Another practical advantage of the V8 Diesels is the 2500 rpm. This gives you an ideal relationship of horsepower, torque and speed to permit the use of lighter, more compact, less costly transmissions. In other words, your initial investment is reduced as well as the maintenance cost during operating life.

Cummins exclusive PT fuel system also reduces maintenance and fuel costs. It operates on lower priced No. 2 diesel fuel . . . has fewer parts than any other diesel fuel system. The pump is mounted in the 90° angle formed by the cylinder banks. Also possible, on the V8-350 . . . either the intake or exhaust manifold can be placed inside the "V" to fit your application requirements.

Get the complete profit-making story on these new compact V diesels, and on the models in which they are available, from your nearest construction equipment representative or Cummins Distributor.

V8-350 PERFORMANCE CURVES



Ratings corrected to conditions of 29.92" hg (sea level) barometric pressure; 60° F intake air temp.

Litho in U.S.A. — MP 60

Industrial Minerals Stressed At A.I.M.E. Southwest Conference

METALS and materials for the Space Age was the theme of the annual A.I.M.E. Southwest Metals and Minerals Conference, held April 21 and 22 at the Ambassador Hotel in Los Angeles.

Two sessions of the gathering were devoted largely to industrial minerals. Robert Mitchell, Consolidated Rock Products Company, and Peter Nalle, Riverside Cement Company, were the chairmen for these sessions.

A history of the sand-and-gravel industry in the Los Angeles area was outlined by Harold G. Feraud, executive-secretary of the Southern California Rock Products Association. A veteran in the business in Los Angeles, Mr. Feraud has seen the industry grow to its present stature as the largest sand-and-gravel producing area in the country.

Zoning problems facing the producers were revealed in a talk presented by Frank Gillelen, consulting engineer, as an exploding population in Southern California continues to engulf the areas surrounding the deposits and producing plants in the metropolitan regions.

Rock roofs are being widely utilized, particularly in tract housing in the Southwest, and the industry supplying this material, usually white limestone and dolomite, has grown greatly in recent years. Specifications and other aspects of the roofing-rock trade were revealed in a paper prepared by Stuart H. Ingram, Hammer-Milled Crushed Rock Company.

J. H. Lucas of the Permanente Cement Company described the Cushenbury limestone quarry operated by his company near Lucerne Valley, Calif. The quarry supplies both kiln feed to Permanente's Cushenbury cement plant and flux stone for the Fontana mill of Kaiser Steel Co. Each end use requires rock of different analysis and sizing.

Progress in the standardization of specifications for sand-and-gravel aggregates was outlined by Stanton Walker, director of engineering of the National Sand & Gravel Association, Washington, D. C.

At a luncheon meeting on the opening day of the conference, Joseph L. Gillson, DuPont's chief geologist and currently president of the A.I.M.E., spoke on *Industrial Minerals of the Great Southwest*.

F. M. Smith, mining engineer, United States Borax & Chemical Corporation, described the past, present, and future mining methods at his company's Boron, Calif., workings. Underground mining began in 1926 and progressed until May, 1957, when an open pit supplanted below-ground recovery. Future mining plans call for belt-conveyor haulage for both ore and waste removal. Use of conveyor haulage and the bucket-wheel excavator appear to be the best solution; however, tests are continuing, to determine finally whether this type of machine can successfully cut the hard overburden encountered at Boron.

After the 2-day conference, a trip was conducted to the Boron pit and processing plant.

Bradford Hills Named Agency Of Keystone Trappe Rock Co.

Bradford Hills Quarry, Inc., was named exclusive sales representative for Keystone Trappe Rock Company, Glenmoore, Pa., effective March 1.

J. G. Galt, president, and Howard Galt, vice-president of Keystone, will remain in these respective positions and will continue to operate the Cornog (Glenmoore) plant.

Miles Washburn, formerly with Keystone Trappe Rock, will now be associated with Bradford Hills. His territory will cover south Jersey, Maryland, Delaware, and southeastern Pennsylvania.

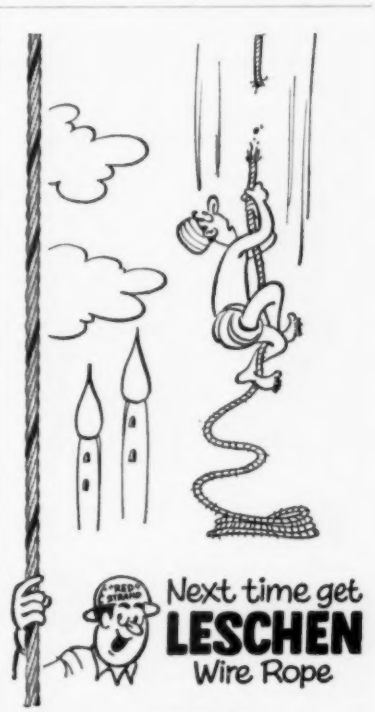
Bradford Hills Quarry operates transit-mix concrete plants in Lititz, Oxford, and Kennett Square, and quarries in Downingtown, Norristown, Morgantown, and Newport, Pa.

San Francisco Chemical Co. To Build Plant in Utah

San Francisco Chemical Company will erect a major phosphate rock crushing and beneficiation plant at Vernal, Utah. It will eventually be comprised of six units with a combined capacity of more than 1,000,000 t.p.y. of acid grade phosphate concentrates. Unit number one should be completed by November, with an initial output of 200,000 t.p.y. of concentrate.

Western Knapp Engineering Company designed the operations. Open-pit methods will be used. After material processing, the concentrate will be trucked 200 miles to Western Phosphates Inc. at Garfield, Utah, as raw material for the production of wet-process phosphoric acid, treble superphosphate, and ammonium phosphates.

DONALD C. WEBER was recently named assistant sales manager for Universal Atlas Cement Company, a U. S. Steel Corporation subsidiary, succeeding FOSTER A. HAGAN.



LESCHEN WIRE PORTER ROPE DIVISION
H. K. PORTER COMPANY, INC.
Enter 39 on card, page 197

Ten-Year Growth of Industry Cited at Perlite Institute Meeting

AT the 11th annual Perlite Institute meeting in New Orleans on March 15, 1960, one of the nation's youngest industrial groups marked 10 years of activity, with a reported increase in volume of 1,180 percent in perlite ore shipments from 1949 through 1959!

Twenty years ago perlite was unheard of as a product for industrial or consumer use. Lee Boyer, an assayer in Superior, Ariz., is generally given credit for the first commercial application of perlite in the United States. In 1940 (or 1941) while he was investigating perlite for use in enamel, he noted the unusual expansion characteristics of the ore. Further investigations were delayed until after World War II, when a number of investigators set up expanding plants.

In 1949 a group of 18 perlite miners and expanders met in Los Angeles and formed the Perlite Institute to promote the development of the infant industry, establish standards through research, explore new uses and markets, and co-operate with government and other agencies.

New officers installed at the 11th annual Perlite Institute meeting in New Orleans were as follows: president, Norman E. Braun, operations manager, Cleveland Gypsum Co.; and vice-president, Theron L. Lehr, general manager, Texas Lightweight Products Company. Directors named for two-year terms are D. Loring Marlett, vice-president, Great Lakes Carbon Corp., Mining and Mineral Products Division; and J. C. Kingsbury, vice-president, Johns-Manville Perlite Corp.

Norman E. Braun, president of Perlite Institute, Inc.

In his annual report to the members, Marve Narramore, managing director of the Perlite Institute, reported that Perlite Institute members had shipped 24,000,000 cu. ft. of expanded perlite and 215,000 tons of ore during 1959—a greater volume than in any other single year of the institute's history. Expanded perlite shipments increased 21.8 percent over 1958 and 24.7 percent over 1957. Perlite ore shipments in 1959 were 2.7 percent greater than in 1958 and 3.2 percent above the 1957 total.

Expanded perlite shipments increased 475 percent in 1959 over the first year of the Perlite Institute operations in 1949; perlite ore shipments have increased 1,180 percent during the same decade.

At the meeting in New Orleans another committee was added to the present group of committees, this one to explore, research, and test for more diversified perlite uses which may reach eventually into every type of industry.

D. L. Marlett, retiring president, and J. C. Kingsbury, former president, stated that the possibilities of perlite are unlimited; that the horizons will expand far beyond the expectations of the 18 members who formed the institute 11 years ago.

● This Stearman biplane is dropping borate slurry on a fire in the Inaja forest in California. The tank carried by the plane has a capacity of 100 gal. U.S. forest fire fighters have found bentonite or sodium calcium borate very effective in combating devastating forest fires. These materials hold unusually large amounts of water; they stick to vegetation and will not burn. Bentonite slurry dropped by low-flying planes will render a large area of a forest fire-resistant. This technique of aerial bombing forest fires with non-flammable materials was perfected in 1958, and by 1959 more than 3,300,000 gal. of slurry had been used to combat fires in western states.

Aluminum Ions Affect Soil pH—Reduce Lime Neutralization

Limeographs (April, 1960) reports that according to M. R. Heddleson, assistant professor of agronomy at Ohio State University, aluminum in soils can cause an error in the lime requirement as determined by the pH test. This is due to a "buffering" reaction.

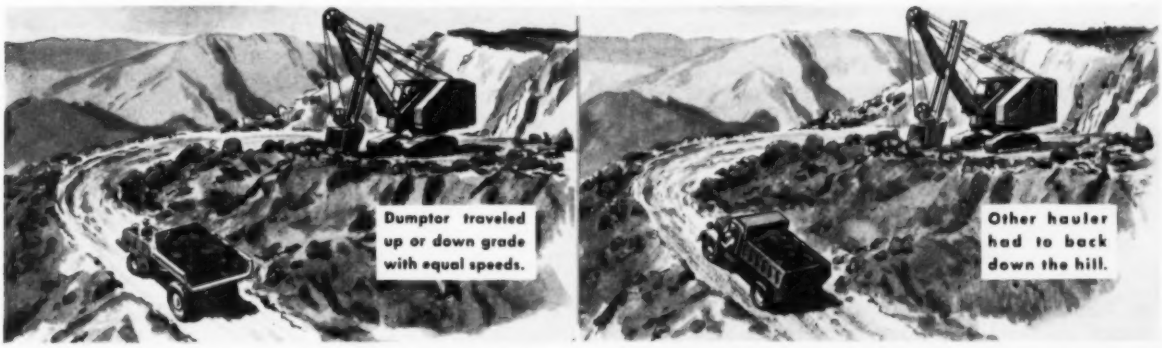
When lime is added to soils in which the acidity is largely due to aluminum ions, the positively-charged aluminum combines with the negatively-charged OH ion of water, forming a solid mineral and leaving the positively-charged H ion of water free to contribute to soil acidity. Thus, the neutralizing benefit from liming is smaller than expected, and the soil remains partly acid.

TIMED TO PROVE FASTER HAULING

On the job described here, a 15-ton Koehring 100 Dumptor was matched against another leading rear-dump hauling unit. The Dumptor out hauled its competition by an amazing margin — actual time studies (see table) showed the Dumptor making almost twice as many round trips! Why the big difference? One reason was that the competitive hauler had to back down the grade — as one observer said, "You could smell the brakes burning".

Check out the 100 Dumptor in your own operation. Here's a 30,000 lb. payload machine with a big 10' x 10'-9" body. Instantaneous or controlled dumping. No turn operation. Full speed in both directions. Hydraulic clutches for direction and speed range selection combine with torque converter drive and power-steering for maximum operating ease and speed. Your Koehring distributor has all the facts. Call him for a demonstration.

HAUL UNIT	HAUL TIME			DUMP TIME			RETURN TIME			AVERAGE TRIP
TYPICAL TRIPS	#1	#2	#3	#1	#2	#3	#1	#2	#3	
15 TON DUMPTOR	:48	:53	:49	:07	:06	:04	:37	:43	:48	1 min. 38 sec.
18 TON REAR DUMP HAULER	1:25	2:00	1:53	:14	:16	:17	1:12	1:09	1:14	3 min. 13 sec.



Test of Dumptor vs. rear dump hauling unit on job covering 603 feet total one-way haul with 204 feet of total distance on a 20% grade.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

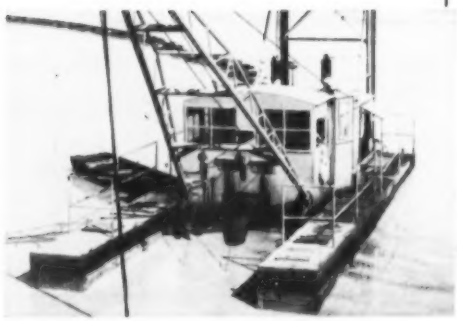
MODEL 100
15 TON DUMPTOR

K21

300,000 TONS IS A LOT OF SAND!

Yet this Pump has delivered that tonnage

WITHOUT WEAR!



Hardy SAND COMPANY
NATURAL BOND AND SILICA

ALL TYPES OF FOUNDRY SANDS CONTROLLED TO SPECIFICATIONS

EXECUTIVE OFFICES EVANSVILLE, INDIANA

April 5th, 1960

E. A. Thomas
Thomas Foundries, Inc.
P. O. Box 1111
Birmingham, Alabama

Dear Mr. Thomas:

I regret to say, but I am afraid the Hardy Sand Company will not be a very good customer for repair parts such as liners, impellers etc., for our Thomas DURABLE Dredge Pump, Model HL.

I had occasion to look at the interior of the pump mounted on our dredge at Plant #4 and could see no wear, just brightened up. Incidentally, this view of the pump was after pumping approximately 300,000 tons of sand. I might underscore that word "DURABLE" in the above.

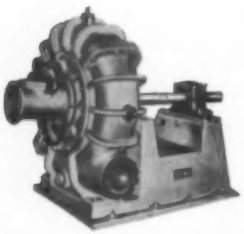
At this rate, it will be a couple more years before we scream for parts.

Very truly yours,

Hardy Sand Company

T. H. Hardy, Partner

Left: Sand Dredge of Hardy Sand Company, Evansville, Indiana, equipped with Thomas DURABLE Dredge Pump, Model HL.



That's another Thomas Pump owner talking. With a touch of humor, he regrets that "it may be a couple more years before we can scream for parts"!

He writes this—after his pump has been in operation for about a year and a half and delivered approximately 300,000 tons of silica sand! No wonder he feels in a good humor—he has something to laugh about. When he recently inspected the liners and impeller of his Thomas Pump, those parts showed "no wear, just brightened up."

Now he suggests that the word "DURABLE" be underscored. And there are many, many other Thomas Pump owners who will agree with him!

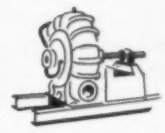
Thomas Pump's INCREASED SERVICE LIFE is due to improved design and modern materials. The Thomas Pump is especially designed for the use of Thomas Ni-Hard alloy, a metal which is highly resistant to abrasion. The net result, proved by operating reports from all sections, is that "YOU CANNOT BUY AT ANY PRICE A MORE DURABLE PUMP FOR SAND AND GRAVEL —YOU CANNOT BUY ANOTHER PUMP THAT WILL MAKE YOU AS MUCH MONEY."

Write or wire for further information.

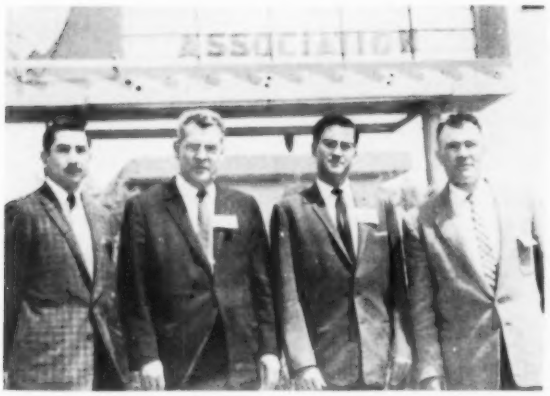
Thomas Durable Dredge Pumps are manufactured in range of sizes from 6" to 16" discharge. Write or phone for additional information.

THOMAS FOUNDRIES Inc.

P. O. BOX 1111, BIRMINGHAM, ALABAMA



Natl. Slag Assn. Operators
Enjoy Varied Program at Galveston



E. W. Bauman, managing director, N.S.A. (second from left), standing with Liberato Cantu' Jr. (at his left) and Carlos Fernandez Leal (at his right), both of Constructora Popular, Monterrey, Mexico; and Bill England (extreme right), National Slag Limited, Hamilton, Ont., Canada.

THE 1960 meeting of the National Slag Association Plant Operators, held on March 31 and April 1, was one of the best, both from the standpoint of attendance and program. A total of 43 participated in the two-day session. Representatives were on hand from practically every member plant in the United States, as well as from Constructora Popular, Monterrey, Mexico, and National Slag Limited, Hamilton, Ont., Canada.

Most of the time was taken up for consideration of the various subjects listed on an agenda that had been prepared by a special program committee prior to the meeting. Subjects discussed involved the following: crushing, screening, conveying, iron removal and salvage maintenance problems, plant safety, interplant communications, dust control, and production problems brought on by specification requirements.

During the luncheons on Thursday and Friday outside speakers were brought in to discuss interesting problems. On Thursday noon Glen Jackson, manager of insurance, Vulcan Materials Company, presented a discussion on industrial insurance. He emphasized the fact that a good plant safety record is undoubtedly the best assurance in obtaining the lowest insurance rates.

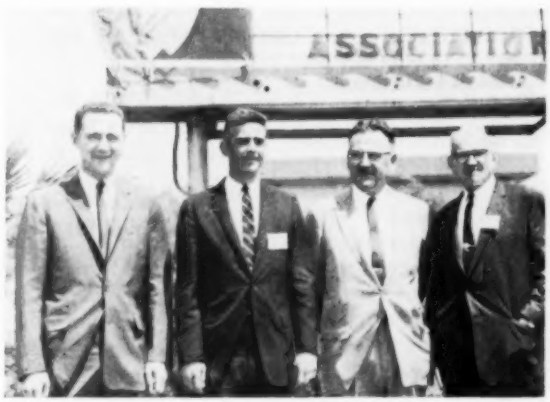
On Friday Carl Leinert, manager of the blast furnaces, coke ovens, and sintering plant, Sheffield Division, Armco Steel Corporation, discussed operational problems of a blast furnace as they might affect production and quality of slag.

Later on the same day the members journeyed to Houston for an inspection of the plant and operations of the Houston Slag Materials Company.

Despite a very full program of scheduled business, the delegates and their wives were well entertained by the host company and enjoyed Texas hospitality to the fullest. Among other special luncheons and dinners, the highlight of the meeting was a special outing at the Huckster House. This is a most unusual place which serves as the summer home of Roy Hofheinz, former mayor of Houston and a partner of George Mattison in the Houston Slag Materials Company.

Wilson E. McDermut, general superintendent, Illinois Slag and Ballast Company, was elected chairman of the committee for 1960-61, and Chester H. Mitz, vice-president, Duquesne Slag Products Company, was named chairman of the program committee.

Although no dates were fixed for the next (1961) meeting, the group decided that the meeting will be held in Cleveland, Ohio.



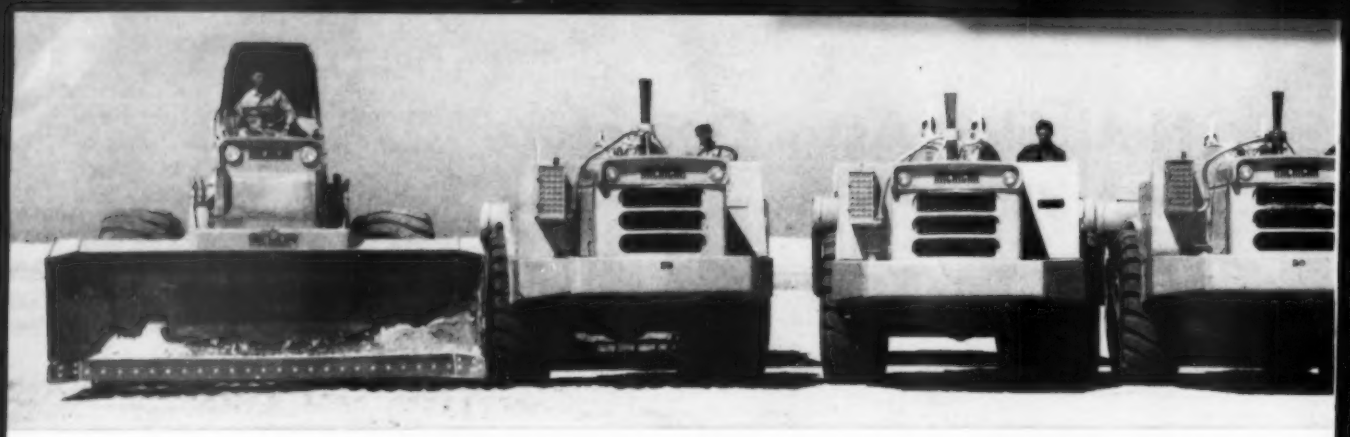
Wilson E. McDermut (second from left), newly elected 1960-61 N.S.A. committee chairman, with E. C. Levy Jr., Ken Kagarise, and L. L. Warren, all past-chairmen of this committee.

National Gypsum Goes West—Acquires Arizona Plant

National Gypsum Company recently acquired the Union Gypsum Company at Phoenix, Ariz., through an exchange of stock. This acquisition is National's first venture west of the Rocky Mountains.

Union Gypsum was founded in 1954 by its president, M. R. Prestridge, and several associates. The firm markets gypsum wallboard, lath, and plaster in California, New Mexico, Texas, and Arizona. Its raw gypsum is supplied from a deposit at Winkleman, Ariz. — about 95 miles from Phoenix.

A $750,000 crushing plant is in process of erection at Bamberton, B. C., for the British Columbia Cement Company. The installation will have a capacity of 600 t.p.h.



▲ Accent on rubber is evident from Holloway's line-up of equipment. Note the two Michigan Tractor Shovels, the three Michigan Scrapers, and the Michigan Dozer—all on rubber.

Matched earthmoving team—Michigan Model 380 Dozer push-loading Michigan Model 210 Scraper—picks up 18 tons of sand-silt-clay overburden in 40 to 75 seconds. Later, same machines will load gypsum. ▼ Average payload in this material: 16½ tons.

Gypsum producer halves machine needs, cuts operating costs, yet raises output. The "key":

His Matched Michigan Tractor

Operating efficiency has hit an all-time high—and costs an all-time low—for H. M. Holloway Inc., California's largest producer of gypsum.

Main reason is a switch in their work fleet from crawler to rubber.

Three 19-yd Model 210 Michigan Scrapers now handle both overburden removal and gypsum mining. These units are the only Scrapers on rubber which have proved capable of climbing up soft sand-silt stockpiles.

A Model 380 Michigan Dozer handles scraper push-loading. Its 375 hp on rubber has cut average load time from 2½ minutes to under 1 minute.

Two Model 175A Michigan Tractor Shovels load the finished gypsum . . . 22 ton trucks in less than 4 minutes each.

With scrapers, dozers, and loaders all one make—all with similar power trains, controls, engines, tires, etc.—Holloway gets the benefits of lower parts stocks . . . easier operator training...easier servicing.

Michigans have brought about *much lower operating costs, too.* Holloway's records show total hourly costs for each machine (wages, fuel, maintenance, parts, depreciation, insurance and taxes) to be equivalent to what they were previously spending on *crawler track maintenance alone*, according to H. S. Holloway, company president.

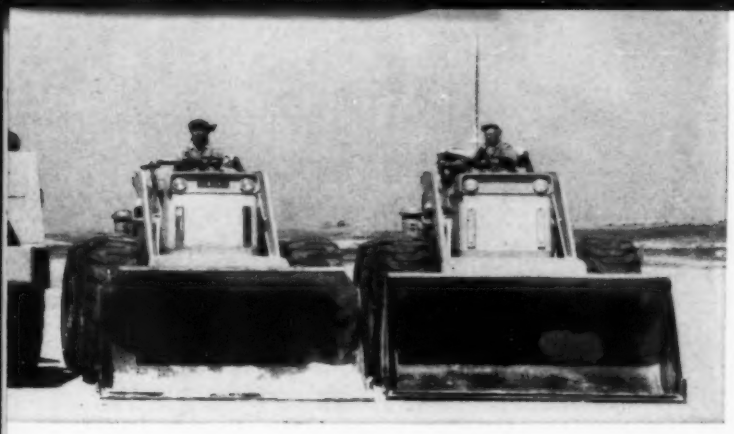
"We now mine, mill, and load over 3,000 tons of gypsum a day," says Claude Knox, company v.p.

"The Michigan Dozer and Scrapers, four units, do *twice the work* of the *six* crawler-mounted rigs they replaced," adds Mr. Holloway.

"What's more," he says, "we used to remove no more than 3 ft of overburden to get at 3 ft of gypsum. Now, the ratio has been cut to 3 ft of overburden to *2* ft of gypsum . . . so layers once wasted are now profitably mined."

Overburden removal: 2,500 tons every 9 hours

In typical operation, the Michigan



▲ Scraper unloads silty overburden on 35- to 40-foot-high piles over wasteland. Once considered a crawler job (other rubber-tired scrapers tried and failed), the Michigan handles hill-climbing on free-running silt with comparative ease. ▼

◀ Michigan Tractor Shovel attacks gypsum stockpile, loads 2¾ to 3 cu yds per "bite." Typical 22 ton truck takes 6 passes, 3½ minutes.

Dozer-Tractor Scraper fleet

Dozer-Scraper four-unit team strips 2,500 tons of overburden every 9-hour shift. By building dump piles 35 to 40 ft high in adjacent-mined-out areas, double-handling is eliminated, also haul distances are kept under 1,000 ft. This, incidentally, is the job no other rubber-tired Scraper could do; success of the Michigans in climbing the free-running silt is attributed by Mr. Holloway to their excellent balance, power-shift-torque converter drive, and high ratio of horsepower to loaded weight.

Same units mine gypsum

When all overburden has been removed from a work area (usually 400 x 800 ft), the Michigan Dozer-Scraper team keeps right on working, removes the layer of gypsum. This material is dumped in windrows, roughly 11 ft wide, 2 ft deep, 600 ft long.

Tractor Shovels load 2,200 tons daily

Next step is processing—300 tons per hour—and the final step, once the ready-to-use, one-inch-minus material is spewed by a conveyor into large stockpiles, is loading. This last job is handled by two 2¼ yd Michigan Model 175A Tractor Shovels. Their output averages 2,200 tons per unit per day.

Demonstrate? Glad to!

If *you* are one of the *11,000 owners* of Michigan Tractor Shovels, we urge you to look into the added efficiencies of having the same power train in *your* Dozers or Scrapers. Pick the Michigan model and size you'd like to see . . . then call to arrange a demonstration. Michigan Tractor Shovels are now available in bucket capacities of 9 cubic *feet* to 10 cubic *yards* . . . Dozers: 162, 262, 375, and 600 hp . . . Scrapers: 10½, 19 and 29 yards.

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Michigans help increase production while manpower remains constant. Latest example:

13-ton Tractor Wagon replaces

By replacing three 8-ton dump trucks with one 13-ton Michigan Tractor Wagon, manpower and maintenance expense have been substantially reduced in the stockpiling operation at the Lee Crawford Quarry Co., Cedar Rapids, Iowa.

Lee Crawford, owner-operator of this 250,000 ton per year Florentine limestone quarry and crushing operation, believes in matching equipment to the job. Production has steadily increased since he started "from scratch" 14 years ago, even though for the past 8 years his crew of eight men has remained the same. He has been able to do this by increasing equipment capacity and efficiency.

Michigan Tractor Shovel replaces swing shovel, portable conveyor

Five years ago his first Michigan machine was purchased . . . a Model 75A Tractor Shovel which replaced both a swing shovel and a portable conveyor. This permitted reassignment of one man for work in another part of the quarry. The unit handles *all truck loading* at the stockpile. It also grades haul roads and unloads equipment from trucks.

The economical and efficient operation of the Tractor Shovel proved so gratifying that when it came time to replace three dump trucks used to haul from crusher to stockpile, Owner Crawford decided to see what else the Michigan line had to offer. He called in Michigan Distributor, Spreitzer Inc., from Cedar Rapids.

Stopwatch demonstration proves speed and capacity

After discussing his needs, the Distributor brought out a 13-ton Model 110 Tractor Wagon. On a typical cycle, the Michigan loaded 3-inch stone at the crusher bin, traveled 400 ft to the stockpile, made a 90-degree turn, backed 100 ft up a 17 percent adverse grade, unloaded *over the edge* of the stockpile, and returned 500 ft to the bin—all in less than 2 minutes. Average speed for traveling, backing and accelerating was 9½ mph. Similar results were obtained on runs to all four stockpiles.

It was evident that one man and the one Tractor Wagon could do more work than three men with the three dump trucks. This was the kind of production Mr Crawford was looking for. The Michigan stayed. Two of the truck drivers were reassigned jobs in other quarry operations. Thus, manpower in the stockpiling operation was

Michigan, by dumping over edge of bank, eliminates need for dozer cleanup.

During free time from stockpiling, Michigan hauls shot rock.

Big top-opening speeds loading of crushed stone.

Capacity and efficiency of Michigans, as proved by five years experience with this Tractor Shovel, triggered purchase of the 13-ton Tractor Wagon.

three 8-ton dump trucks

cut by ⅔. Maintenance, too, was reduced from three machines to one.

Stockpiles 2,500 tons per 7½ hour day

Today, a typical 7½ hour shift calls for 24 trips per hour from crusher bins to stockpiles. Distances vary. Maximum round trip cycle is 1400 feet. Average is 600 feet, with good cycle time figured at 1 minute and 20 seconds. Hauling in excess of 13 tons per load, production amounts to about 2,500 tons per day. The Michigan is scheduled to keep all stockpiles at an operating level of 30,000 tons. Normally it can do this and still have time to assist in other areas of the quarry.

Hauls shot rock, too

Naturally, the 162 hp Model 110 is right at home in the quarry pit too. Here it frequently helps two conventional off-the-road dump trucks haul shot rock to the crusher. It accelerates fast . . . also has the major advantage, because of the rolling action of its big low-pressure tires, of reducing haul road maintenance.

Truck problems eliminated; so is need for dozer cleanup

"Another major Michigan advantage," says Mr Crawford, "is its ruggedness. Our trucks were being beaten to death on this work. We've had lime piles 50 ft high with grades the trucks just couldn't pull, not to speak of frame distortion and all its complications. This has all been eliminated by changing to the Michigan. Also, the Tractor Wagon's ability to dump over the edge of the stockpile has done away with the part-time need of another machine to push the material over. The Michigan is a good example of what I mean by matching equipment to the job."

Get all the facts

Like to see how a high-speed rear-dump Michigan Tractor Wagon can be matched to *your* job? Then call your Michigan Distributor for all the facts. He has two model Tractor Wagons to choose from—13 ton and 25 ton capacities.

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AIR-COOLED
DEUTZ DIESELS
PUT PUNCH
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Michigan 85D Loaders with Air-Cooled Deutz Diesel A 6 L 514

At a bitter −40° or at a fearful +140°F, the Deutz air-cooled diesel delivers full power output to these loaders in less than 5 seconds from start. There's never a winter freeze-up; no disappointing hot-weather performance. Eliminating the water system cuts mechanical breakdowns, reduces maintenance, gives you the full horsepower rating of the engine. With air-cooling you run at higher head temperatures, condensation of corrosive sulphurous acids ends, downtime is reduced. Higher head temperatures squeeze every ounce of work out of the fuel.

Many Models, many uses. Deutz diesels range from 5 to 250 HP in 1, 2, 3, 4, 6, 8, and 12 cylinder models. When you're buying new equipment, make sure it's Deutz-powered. And check your present equipment — graders, concrete mixers, sweepers, generators, compressors. See whether it won't pay to convert to Deutz now.

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These visiting French sand and gravel men, on a tour of American installations, paused for their picture in front of the main offices of the American Aggregates Corporation in Detroit. Standing in the door (back row) is R. S. Evans, vice-president of A.A.C. Jim Hampton and Larry Clark of the firm are at the far right.

French Sand-Gravel Producers Visit American Installations

A group of 18 French businessmen, most of whom are members of the Alsatian Association of Materials Producers (sand and gravel) recently made a whirlwind tour of several Eastern and Midwestern U. S. gravel plants. (See accompanying picture.)

Their tour included visits to the National Sand and Gravel Association offices in Washington, D. C.; Colonial Sand and Stone Company on Long Island, N. Y.; the Warner Company in Philadelphia; the Material Service Corporation in Chicago; and the American Aggregates Corporation's Detroit office and Green Oak, Mich., plant.

An interpreter assisted the American Aggregates personnel (including R. S. "Mike" Evans, vice-president) during a conducted tour of a gravel dredge and through the processing plant at Green Oak.

The French visitors stated that the principal differences between American and French sand and gravel operations involve transportation methods and the volume of materials "wasted." Because the demand for aggregates in France is always so far ahead of the supply, the French waste practically nothing, but find a market for the poorest grades and for all sizes of gravel. In France sand and gravel is transported mainly by barge, either on the Seine or the Rhine, rather than by truck or by rail as in this country.

65-Year-Old Colton Cement Co. Launches Largest Expansion

A $7,000,000 expansions program has been initiated for Colton Cement Company, Colton, Calif. B. W. Vaughn, superintendent of the firm, has announced that company engineers are working with General Electric on a process-control computer that will aid in making the plant an outstanding example of automated processing.

Completion date for the total program is set for late next year. Other features in the expansion include two kilns with a total capacity of 6,000 bbl. per day, and 21 storage silos.

At one time air pollution problems in the area created by cement residue caused the management to consider abandoning the plant. Glass bag filtration solved this problem, and justified the consideration of expansion plans.

A new limestone quarry has been opened by the Missouri Valley Limestone Company along Highway 71, four miles south of Atlantic, Iowa. Deposits are under 40 to 50 ft. of overburden.

Inland Lime & Stone Quarry, Bestwall Gypsum Mine Cited for Safety Records

Six mines and quarries in Michigan, Minnesota, New York, and Pennsylvania have taken top honors in the 35th National Safety Competition sponsored by the U. S. Bureau of Mines. In the nonmetals group, winners were operations of Inland Lime and Stone Co. and Bestwall Gypsum Co.

The winners, achieving the best safety records in their respective groups during 1959, were selected from 672 competing mineral operations—the second-largest number in contest history. For the first time since 1952, all winners were free of disabling injuries.

Mines and quarries participating in this event reduced the injury-frequency rate to a new low—18.29 disabling work injuries for every 1,000,000 man-hours of exposure. The average of these disabling injuries was the third-lowest since the first annual competition in 1925.

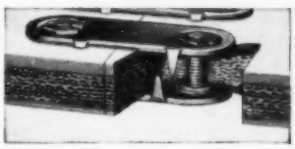
Winners in each of the six participating groups will receive bronze "Sentinels of Safety" trophies and green-and-white safety flags provided by *The Explosives Engineer* magazine. In addition, every employee and official at a winning operation will be awarded a Certificate of Accomplishment in safety by the Bureau of Mines.

The winning quarry operation was Port Inland Quarry, Inland Lime and Stone Company, Division of Inland Steel Company, Gulliver, Mich., which operated 451,317 man-hours without a disabling injury. This is the fourth time the Port Inland Quarry has won the trophy. A participant in 27 successive contests, it ranked first in 1938, 1939, and 1951 and received honorable mention in 1933 and 1934.

The Akron Mine of Bestwall Gypsum Company, Akron, N. Y., which operated 265,192 man-hours without a disabling injury, was tops in the nonmetals underground group. This was also the second competition for the Akron Mine; it was awarded third place in its group in the 1958 contest.

ANOTHER FLEXCO SPLICE DOING A DEPENDABLE JOB AT *MATERIAL SERVICE CORP.*

Picture courtesy of Material Service Corp., Yard #15, Lockport, Ill.



Cutaway of a Flexco application showing compression plates, teeth and precision-made bolts and nuts.

Belt maintenance crews like to work with Flexco fasteners because they are easy to apply — joints last a long time — worn plates can be replaced quickly — ideal for repairing rips and tears.

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . The quality fastener for all heavy-duty conveyor belt applications: SAND & GRAVEL, CRUSHED ROCK, COAL & METALS, CONSTRUCTION EQUIPMENT, etc.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

NEW "25-PAK"

"25-PAK" contains enough fasteners to join common belt widths.

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Flexible STEEL LACING COMPANY

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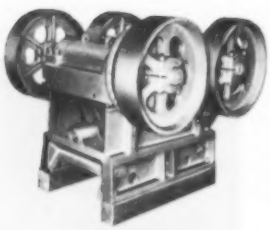
DOUBLE IMPELLER IMPACT BREAKERS

Exceptionally high capacities, plus high reduction ratios which often eliminate the need for auxiliary secondary crushers, screens, conveyors, etc., make Cedarapids Impact Breakers highly profitable in quarrying operations. Six models, from 22" x 22" to 53" x 60" feed opening, meet your capacity needs. Portable models also available.

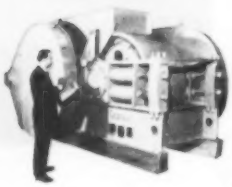
5660-N

Production-balanced components—
CEDARAPIDS ENGINEERED FOR LOWEST COST PER TON



TWIN-JAW CRUSHERS

An exclusive Cedarapids design! Two movable synchronized jaws, operating at high speed, give you 40% to 100% greater primary crushing capacity than single-jaw crushers of comparable size. 5 to 10 times longer jaw life cuts maintenance. Available in three sizes. Single-jaw crushers also offered in 13 sizes.



ROLL CRUSHERS

Where high capacities of the crushed products are required, Cedarapids roll crushers are ideal units for secondary reduction. Six model sizes to meet volume demands and balance primary production.

HORIZONTAL VIBRATING SCREENS

Fast, snappy action, with no soft, cushioning effect. Horizontal cloth openings permit more of the correct size material to go through, yielding 30% greater capacity than same-size inclined screens. Sizes: 3' x 8' to 60" x 16', double and triple deck.

HAMMERMILLS

Exclusive Cedarapids Hammermill features produce a much finer quality of product, and size for size, produce more tons per hour than other similar types of equipment. 4 sizes available.

Plus feeders, conveyors, vibrating grizzlies, washing plants, bins, etc.

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Beat rising costs with a

CEDARAPIDS ENGINEERED STATIONARY PLANT

In the face of rapidly rising operating costs and growing competition, there's one good way to get out of the slim-profit strait jacket. Call in Cedarapids Engineers to "tailor" a stationary plant to your specific needs.

Cedarapids Engineers will give you a sound evaluation of your raw material, job site and operating conditions, and your potential market. They will incorporate the newest developments in equipment and the latest technical improvements in plant engineering. You'll benefit with an *engineered* plant, cleanly designed with the minimum number of the proper type of components to give you the desired capacity of improved, specification products . . . and with the maintenance and operating economies that assure lowest cost per ton.

Your Cedarapids Dealer will show you how to take advantage of this cost saving, time saving, one-company service. Or write direct to Cedarapids Special Plants Engineering Department.

IOWA MANUFACTURING COMPANY

CEDAR RAPIDS, IOWA

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☐ Cedarapids Stationary Plant Engineering Service

☐ Components_____ (specify type) ☐ Portable Aggregate Plants

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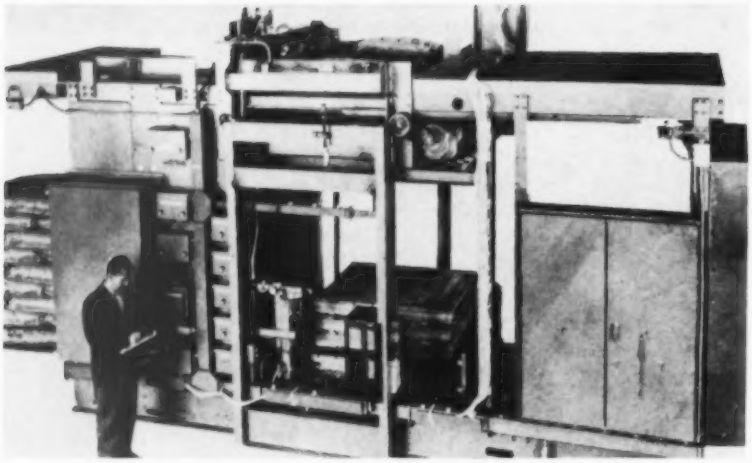


Bags are received from the production line at the top center of the machine; a turning mechanism gently positions them. The stripper conveyor, center, is lowered when a row is in position, so that the bags rest on the stripper carriage. When a row has been formed, the stripper carriage retracts, depositing the tier on the pallet, or on the preceding tier. When the pallet is loaded, it is discharged at the left. Empty pallets are stacked under the stripper carriage, to be fed into the machine from the right by a fork-lift truck.

Palletizing of Bagged Products Studied at Seminar of 3 Firms

REALIZING the cement industry's great concern with the problem of economically palletizing bagged products for truck shipment, the managements of Hudson Pulp & Paper Company, New York City, Food Machinery & Chemical Corporation, Riverside, Calif., and Signode Steel Strapping Company, Chicago, pooled their research and technical knowledge for a solution.

The results of this combined research were discussed at a seminar in April at the Lehigh Valley Club, Allentown, Pa. Subjects covered were automatic palletizing of bagged materials, disposable fiberboard and wood pallets, and methods of loading palletized bagged materials on trucks and railroad cars. Wood pallets *vs.* cardboard pallets, proper pallet sizes, and cost figures per pallet were covered.

Moderator of the seminar was B. C. Drumm, sales manager, Multiwall Division, Hudson Pulp & Paper Corporation. Others participating were Ted Garson, Ray Cummings, and Jim Walsh, also of Hudson; Don Derricott, Irv Blondon, and Lee DeWent, Food Machinery & Chemical Corporation; and Ray Frase, Signode Steel Strapping Company.

In a film presentation, Food Machinery & Chemical Corp. showed how its automatic FMC Lock-Load palletizer rapidly and gently palletizes products bagged in multi-wall paper bags.

This device is an electro-mechanical machine which automatically loads bagged materials onto pallets in interlocked or non-interlocked patterns. It is also available for forming unit loads without pallets or loading bags onto disposable fiberboard or wood pallets.

The pallet-loading machine is floor-mounted, so that no pits or excavations are required. Original installation is simplified, and future relocation of the unit requires few building changes. Designers of the machine have stressed the use of standard, commercially available components to eliminate the need for specialist-type maintenance.

When the machine is in operation, the filled bags are fed into the unit by conveyor. They are then spaced, counted, and turned 90 degrees when necessary to form the desired pattern on the pallet. If spaces are required in the pattern, automatic spacers are dropped or raised in the path of the proper bag, to form such spaces.

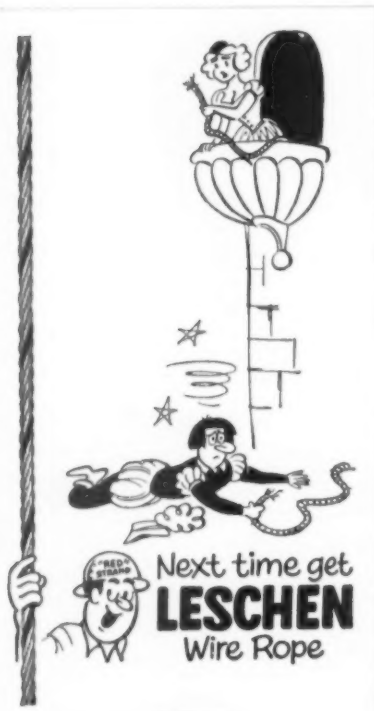
No rams are used for transferring the bags. As the bags are formed into rows, they are transferred onto the stripper carriage. Then the rows are transferred smoothly by a pneumatic system which gently lowers the stripper conveyor and deposits the bags upon the stripper carriage. This operation is repeated until a complete tier is formed.

Upon the completion of a tier, the stripper bar is positioned, and the stripper carriage is retracted to deposit the formed tier onto the pallet or the preceding tier. This operation is repeated until a full load has been formed.

The complete pallet load is then discharged onto the full storage conveyor for removal by a fork-lift truck. The full pallet storage conveyor can accommodate three full pallet loads.

Empty pallets are loaded onto the empty pallet magazine in units of 10 by fork-lift trucks. The pallet magazine will hold two stacks of 10 empty pallets.

Handling speeds of the machine are determined by the type and size of the bags, the pattern, the number of bags per tier, the number of tiers per pallet, and the pallet size. Bag loading speeds in excess of 30 per



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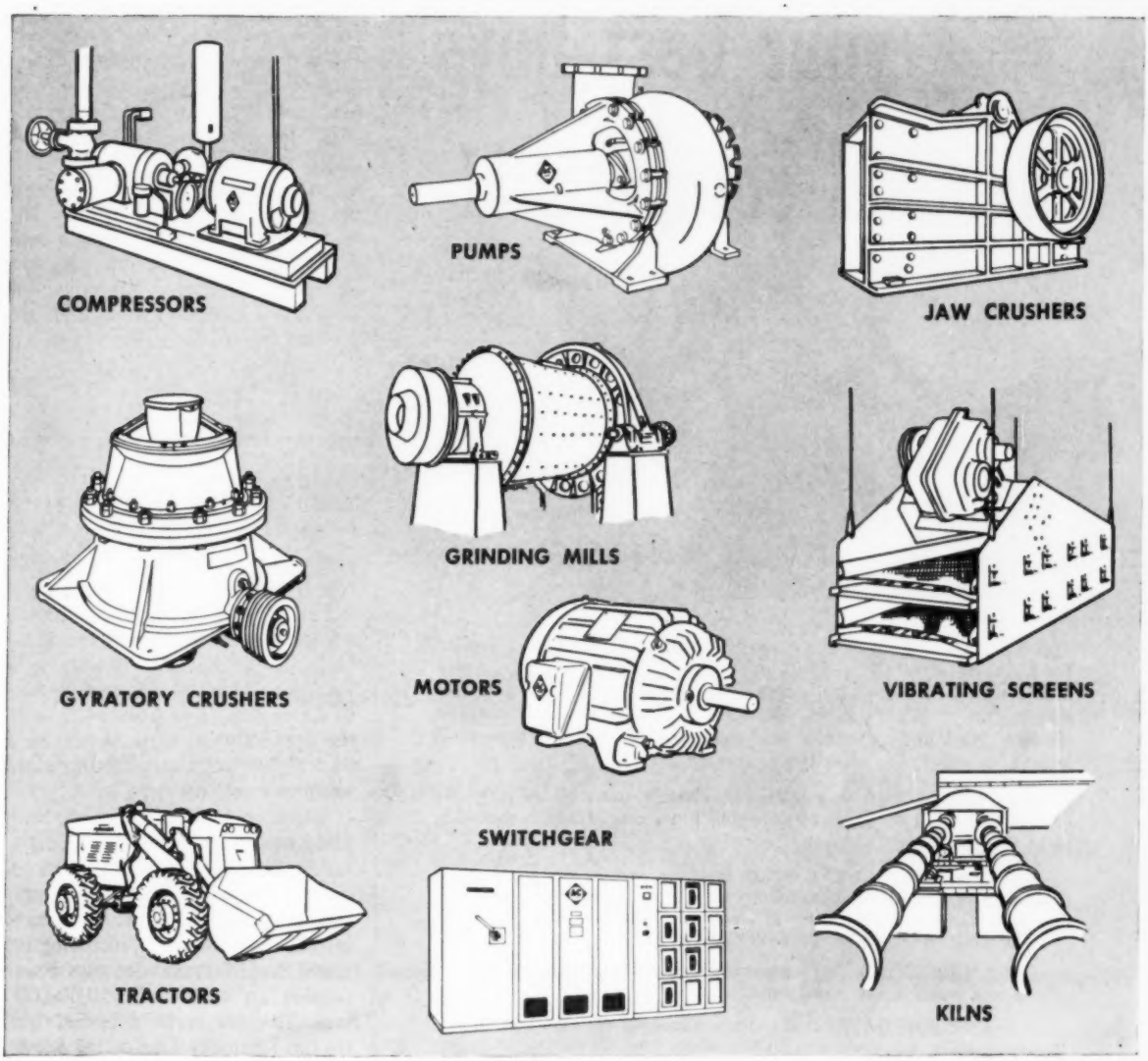

From pit to storage...

boost plant efficiencies...modernize with Allis-Chalmers full-process package

A-C engineers are uniquely capable of analyzing your entire operation and suggesting methods for improving your plant efficiencies. Fuel consumption, power demands, maintenance — all big profit eaters — are apparent to their cost-cutting eyes. And they don't make "guesstimates" — years of experience in the rock products industries furnish them with a background for accurate appraisal. New and unusual problems are referred immediately for test in Allis-Chalmers laboratories and pilot test plant facilities. A-1239

In addition to the equipment shown above, Allis-Chalmers offers a complete line of processing equipment, related electrical distribution, driver and control equipment, pumps and valves for all fluid-flow problems.

Contact your Allis-Chalmers representative or write ***Allis-Chalmers,*** *Industrial Equipment Division, Milwaukee 1, Wisconsin.*

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"This is a section of our used equipment lot—one of over 300 Caterpillar Dealers' lots in the U. S. Right here, as in any of the others, you can find the used machine you want for the purpose you want at a fair, realistic price. What's more, you don't buy 'blind.' We recondition, classify, label and *guarantee* our trade-ins. *We* know what you're buying . . . *you* know what you're buying.

"To help you get what you want, we classify most all of our used equipment into three types of *protected* buys, one of which should be right for your needs. Here they are:

A 'BONDED BUY' Cat-built machine, with a warranted value up to $10,000—it guarantees satisfactory equipment performance and supplies free of charge *all* parts and labor on the machine during the guarantee period.

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A 'BUY AND TRY' deal—a written money-back agreement on certain machines not in the above two classifications.

"Regardless of the type or kind of equipment you buy, we want it to earn money and pay off for you with satisfactory performance. We back every machine with prompt service and parts you can trust. Believe me, all Caterpillar Dealers do. Every Caterpillar Dealer offers the best buys in used equipment. You'll find him listed in the Yellow Pages!"

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST USED EQUIPMENT BUYS ANYWHERE

Enter 54 on card, page 197

minute are not uncommon with the FMC palletizer.

Signode Steel Strapping, in a special brochure appended to the report of the seminar, showed how more than 20,000 pallet loads of cement were shipped in a 6-month period.

The Signode Addison-Semmes plan for palletizing paper bags on both wood and expendable corrugated fiberboard pallets was illustrated. Signode recommends packing portland cement 35 to 40 bags per pallet, and mortar cement 50 to 55 bags per pallet. It also recommends that palletizing adhesive be used on all paper bagged materials that will be shipped by rail and on all truck shipments in which anti-slip bags are not used.

2,000 T.P.D. Silica Operation Being Built for New Concern

Thomas C. Carson, one of the country's authorities on the processing and uses of silica, has accepted the post of president and operating head of the Silica Corporation of America (Silcoa), with headquarters in Lexington, Ky. Coincident with the appointment, work began on a $1,500,000 silica processing plant southwest of Elkhorn City.

Silcoa was formed last fall, with The Kentucky Silica Products Corporation holding the largest block of stock. Since then, the leased and purchased holdings of the firm have grown to 35,000 acres, including the firm's Pine Mountain deposits. These contain an estimated 350,000,000 tons. The raw material is described by the Kentucky Geological Survey as 98.8 percent pure.

The high quality of the deposit will make processing relatively simple. Blast-broken silica from the escarpment will travel 2,700 ft. on a conveyor belt to the plant. Three crushing operations, a washing separation phase, and a dryer will be installed in the new plant. Silcoa management expects a processing rate of 2,000 t.p.d.; capacity will be 10,000 t.p.d.

The new president of the firm is noted for his contributions to the development of the flotation method of separating silica. He was at one time associated with International Minerals and Chemical Corporation.

Enter 55 on card, page 197 →

THREE CAT DW21-PR21s *climb 8% grades with 31 tons of clay and limestone*

...and new DW20 and DW21 Series G Tractors have more muscle for even better performance

At Brandon, Miss., Marquette Cement Manufacturing Co. keeps three Cat DW21s with Athey PR21 wagons busy hauling clay and limestone to crushers. They climb 8 per cent grades on the 2000-foot haul with big 31-ton loads.

Good performance, but new Cat DW20 and DW21 Series G Tractors can boost this. With greater rimpull, higher speeds and stronger components, these new tractors with either wagons or new larger scrapers can better their predecessors on just about any job you've got for them to do. Better performance means just one thing . . . more profit for you.

Both the DW20 and DW21 put 345 HP (max. output) to work. There's 12 per cent more rimpull to give you as much as 20 per cent faster travel speeds under similar haul road conditions, compared to former models. Both tractors have stronger final drive gears and improved transmission shifter forks.

See your Caterpillar Dealer for a chance to operate the new DW20 or DW21 Series G with SynchroTouch Transmission Control—the advanced new way to shift gears easier and faster. Your operators just dial the gear for automatic, split-second response. This optional control makes it easy to choose the right gear for maximum efficiency.

Get to see and try these new tractors at your Caterpillar Dealer's soon. Before you do, think of the toughest test you can for them. Then, when the day comes, see if they don't beat your expectations . . . and then some.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

First Units Going Up at Redding For New Calaveras Plant

Stolte, Incorporated, and Western-Knapp Engineering Company have been awarded a $361,750 contract by Calaveras Cement Company, a division of The Flintkote Company, for construction of a combination shop, warehouse, and garage on the site of the 1,500,000-bbl. plant being built near Redding, Calif.

The buildings constitute the first major unit of the $14,000,000 cement plant which was announced by Calaveras in the fall of 1959.

Henry I. Neeley (left), works manager at the United States Gypsum Company's East Chicago, Ind., plant, is shown accepting a safety citation from Charles W. Desgrey, vice-president, manufacturing. Workers at this plant have put in 3,000,000 man-hours without a disabling injury. In the center is E. C. Beuthin, safety manager for the company.

Move More Profit Tons With Schrock Motorized Pulleys

Schrock's job-proven dependability assures higher profits. Down-time is virtually eliminated, maintenance costs are slashed.

You get power and pulley in ONE package — safe, compact, economical, easy to install. Available in motor ratings from 1 to 125 hp.

WESTERN CONVEYOR CO.

P. O. BOX 357, BOISE, IDAHO, TWX BE 197

William A. Cavanaugh Dies After Distinguished Career

William A. Cavanaugh, 68, who was for many years associated with the Buffalo Crushed Stone Corporation, Bowmansville, N. Y., died recently in Boca Raton, Fla.

Mr. Cavanaugh was a veteran of the construction materials industry, having begun his association with his firm in 1919. He served in several capacities with Buffalo Crushed Stone (now a unit of Houdaille Industries, Inc.) until he became vice-president and sales manager for the stone and blacktop operations.

He retired in October, 1958, and moved to Boca Raton, where he lived until his last illness.

Tighten, Align in Seconds with a Schrock HYDRALIGNER!

A standard grease gun is all you need to hydraulically tighten and align conveyor belts and feeder chains. Eliminate down time, slipping wrenches, rusted or damaged threads. Dependable, accessible, easily piped for remote control. Increases belt life, available in standard shaft sizes.

Enter 56 on card, page 197

Texas Gulf Sulphur Agrees To Develop Utah Potash Field

The Delhi-Taylor Oil Corporation, Dallas, Tex., has signed an agreement with Texas Gulf Sulphur Corporation for the latter firm to acquire and commercially develop certain Delhi-Taylor potash fields in Utah. The oil firm has been doing exploratory and development work on the fields, which are located in the Grand-San Juan County line along the Colorado River.

Since 1953 two large deposits of high-grade potash have been discovered and demonstrated through core drilling; they are described as sufficient for 41 years of operation at a 1,000-t.p.d. mining rate.

Delhi-Taylor will retain a 25 percent net profits interest in the properties, and under the terms of the agreement would receive guaranteed net profits payments of $4,500,000 over a 4½-year period.

Enter 57 on card, page 197 →

one of a series:

HEIL

How to improve dump truck operations

Which hoist: arm-type or telescopic?

The choice between arm-type and telescopic hoists depends on the kind of hauling jobs and conditions you face. There's a place for both.

Telescopics for Maximum Payloads

If maximum legal payloads are your most important consideration and hauling conditions

are not severe, you should look to a telescopic. The very nature of a telescopic hoist makes it lighter in weight so it requires less reinforcing of the body subframe for a given load-handling capacity. Less weight, of course, gives you more payload per trip. Among all telescopic hoists, the headmount type will afford the most payload lifting capacity with the least deadweight in hoist components.

Arm-type for Roughest Work

If your hauling is on rough, uneven ground, you'll want the ruggedness of a well-designed arm-type hoist, with either single or twin hydraulic rams. With fewer bearing points and a simple lift arm linkage, a Heil hoist of this type not only holds its body in alignment with the truck frame as it dumps, but also offers toughness and durability you'll want for heavy-duty service.

Most Important — Get Expert Help

Your Heil distributor has no axe to grind — he sells both kinds of hoists in a complete range of capacities. He knows how to get maximum legal loads in your area . . . can give you a complete package recommendation that will serve you best. So next time you buy a hoist, get unbiased facts from your Heil man. The Heil Co., Milwaukee 1, Wisconsin.

These Heil dump bodies are only a part of a larger Heil fleet at work on a huge air base construction job.

SEND FOR FREE BOOK

THE HEIL COMPANY
Body and Hoist Division, Milwaukee 1, Wis.:

Send me Heil's new illustrated manual, "How to Select the Right Body and Hoist," as soon as possible. (Check here_____if you'd like a salesman to call.)

*Name*_____

*Address*_____

*City*_____ *State*_____

UNION

The *Live Wire Rope Organization

**Charged with creative energy*

To be dubbed "live wire" by customers is nice. But it also is a warning signal which alerts our organization to stay alive to the fact that a greater output of creative energy is necessary when you're in front running position.

In the Union research laboratory and in those of the steel producing organization in which Union is integrated, technicians are hard at work on many new projects. They were started and will be finalized in the field where Union engineers spend more time than in the laboratory.

Classic example of what results from such deep and constant probing is the Tuffy family of wire ropes and slings, each one of them engineered to a specific job. Among 1600 standard wire rope constructions, in day to day production, none could be classified as the ultimate low cost wire rope for bulldozers, draglines, scrapers or hoisting equipment. One by one new metallurgical specifications and rope and sling constructions were tailored to meet the different but tough operating conditions inherent in the jobs these machines perform.

Tens of thousands of applications have established the unchallenged supremacy of Tuffy special purpose wire ropes and slings.

Tuffy Wire Ropes and Slings are "Job Prescribed" for Tough Jobs

Tuffy Balanced Dragline Rope

Tuffy Balanced Scraper Rope

Tuffy Balanced Dozer Rope

At Mount Rushmore National Memorial in South Dakota small fissures in the sculptured faces of Washington, Jefferson, Lincoln and Roosevelt are being sealed with granite dust and white lead. Though the granite sculpture is estimated to last for thousands of years, this preventive maintenance will keep the surfaces smooth and slow the natural erosion process. The insert shows how workmen are suspended on Union Wire Rope.

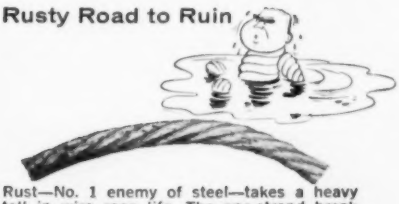
For "Live Wire" Service— Look Up Your Union Distributor in the Yellow Pages

When you get him on the wire, you're sure to get the best in wire rope and slings—plus service that helps you get from Union Wire Rope products all the quality and long life Union builds into them. Union Wire Rope Corporation, 2132 Manchester Avenue, Kansas City 26, Missouri.

Tuffy® Wire Rope Tips

Guard Against These Killers!...Get the Full Measure of Service-Life Built In By Wire Rope Specialists.

Rusty Road to Ruin

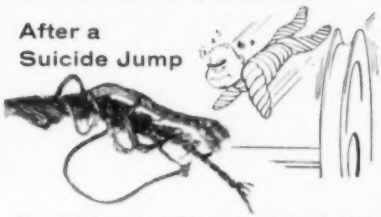


Rust—No. 1 enemy of steel—takes a heavy toll in wire rope life. The one-strand break shown here resulted when the rope was allowed to become rust-bound through lack of lubrication. Tests show that properly lubricated rope has up to 10 times the life expectancy of dry rope.

Crushed by a Tractor Cleat

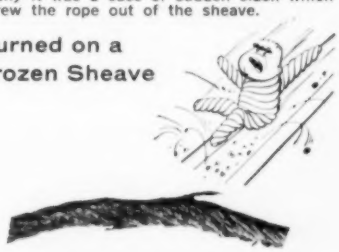
The Sunday punch for this piece of wire rope was delivered by a tractor cleat—just one of many crushing injuries caused by rope being run over or banged into by hard, sharp objects. Even the toughest wire rope is no match for this kind of mistreatment.

After a Suicide Jump



This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

Burned on a Frozen Sheave



End of the line came quickly for this rope as the result of operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope. Sheaves should be checked thoroughly and often.

Would you like a copy of a booklet in which more than a score of Tuffy Tips like those above are reproduced. If so, write Union Wire Rope Corporation, 2132 Manchester Ave., Kansas City 26, Missouri.

Tuffy Balanced Slings and Hoist Lines

2-C

UNION Wire Rope

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Southwest Steel Products

FOR RESULTS LIKE THIS ON YOUR NEXT SHOT...

WHICH

There's a lot of easy digging in this low-lying, well shot pile. A minimum of secondary blasting is needed, and there's no towering muck pile to come showering down on your men or equipment. Breakage and displacement like this gets every possible hour of service out of all your equipment.

Effective blasting control doesn't just happen. There is a combination of explosives and blasting methods that is right for every shot. For instance, if the conditions in your quarry lend themselves to the use of AN blasting agents, *new* Atlas Pellets are porous, compact particles that have higher density and sensitivity for more efficient blasting. On the other hand, for some rock formations, high explosives often do a better job—and more economically. In addition, all types of blasting caps, primers, and special packaging methods are available from Atlas . . . each designed for certain conditions and types of work.

Which Explosive? That's the job of your Atlas Representative. Backed by the complete Atlas line (including all types of ammonium nitrate), his experience with the latest advances in explosives and techniques can help you find the explosives combination and the particular blasting methods that will be most profitable for you on every shot. Our blasting cost chart, slide rules and technical literature are designed to help you determine your lowest true blasting costs. Ask your Atlas Representative about them—or write directly to:

ATLAS POWDER COMPANY
Explosives Division, Wilmington 99, Del.

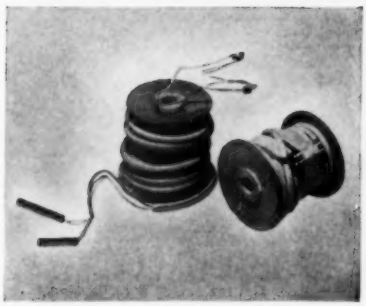
When you use the right combination,
all your equipment
moves in sooner...
works faster...
produces more.

ATLAS PELLETS, a new form of ammonium nitrate, are porous, compact particles that have both the density and sensitivity required for efficient ammonium nitrate blasting.

EXPLOSIVE?

GIANITE, a pre-mixed form of ammonium nitrate, provides the flexibility needed to use ammonium nitrate blasting agents where on-site mixing is difficult or impractical.

GIANT "75" PRIMERS have the wallop required for complete, efficient detonation of both field mixed and plant mixed AN blasting agents, even under severe conditions.



TWINPLEX BLASTING CAPS are two E. B. caps with the leg wires enclosed in a plastic sheath—for detonation at the bottom of deep blast holes, the point of maximum confinement.

ATLAS EXPLOSIVES

new machinery

● Model 70, a portable crushing plant, with a capacity of 175 cu. yd. per hour and traveling weight of approximately 55,000 lb., is being offered by Goodman Manufacturing Company, a division of Diamond Iron Works.

Acceptable road weight for quick moves is a feature.

Material passes a 1-in. screen, based on 25 percent oversize. The component units are a 10 x 36 in. jaw crusher, a 32 x 24 in. star gear roll crusher, a 2½-deck 4 x 12 ft. vibrating screen, and 30- in. wide belt conveyors throughout. (350)

● A worker at the Chicago Heights plant of the American Manganese Division of American Brake Shoe Company checks the spider socket of a 5-ft. cutterhead to be used in dredging.

A one-piece casting, this cutterhead will revolve at the bottom of a lake or river, cutting and loosening sand and gravel, so that it can be sucked up a 12-in. pipe from the center of the cutterhead, by a pump on a dredge. (351)

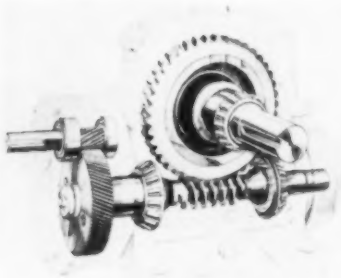
● The Russell Manufacturing Company has developed a conveyor belt made of heavy nylon yarn. The yarn is loomed to produce a complete belt at one time. The space between the yarns is filled with a specially compounded polyvinyl chloride plastic.

These rope-like yarns separated by P.V.C. plastic produce a lightweight high-strength, fire-resistant material which is non-corrosive, nontearing, and abrasion resistant. (352)

● Link-Belt Company is introducing a completely new line of fan-cooled worm gear speed reducers.

They are available in 25 types and over 135 sizes. Ratios range from 5:1 to 3600:1 with torque ratings up to 135,000 lb./in. and 150 hp.

The reducers are right angle drives which adapt compact, high-speed motors to modern production machines. They can operate at high input speeds, and they cover the range from fractional to large horsepower motors. They offer low output speeds with ample capacity for heavy loads. A phantom view of the HWB helical-worm gear speed reducer is shown. (353)



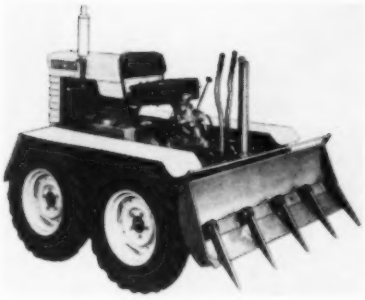
● Hewitt-Robins Incorporated is adding a new railroad car shakeout to its material-handling line.

The new machine, called the "H-R Trackside," is mounted in a fixed position along the railroad track where hopper cars, either open or covered, are to be unloaded. A powerful hydraulic cylinder exerting a force of 14 tons pushes a vibrating head against the side of the car.

Pushbutton-controlled for safe remote operation, it weighs 2,400 lb., has a 7½-hp. high-torque vibrator drive, and a 3-hp. high-torque pump drive. It is designed to meet the needs of operations requiring the unloading of 1 to 10 hopper cars per day of aggregates, ores, etc. (354)

and equipment

for further information use card on page 197



● A low-cost, 4-wheel drive tractor, the W4G062, designed for light industrial and construction work, is available from Detroit Tractor, Ltd. Selection can be made from four models—hydraulically operated and ready equipped models—bulldozers, grader clam, roll bucket, and loader.

Differential steering reportedly gives a turning radius of 12 in. in a 6-ft. curb-to-curb circle. The scarifier rack can be easily detached. Tires are 7.50x16. **(355)**

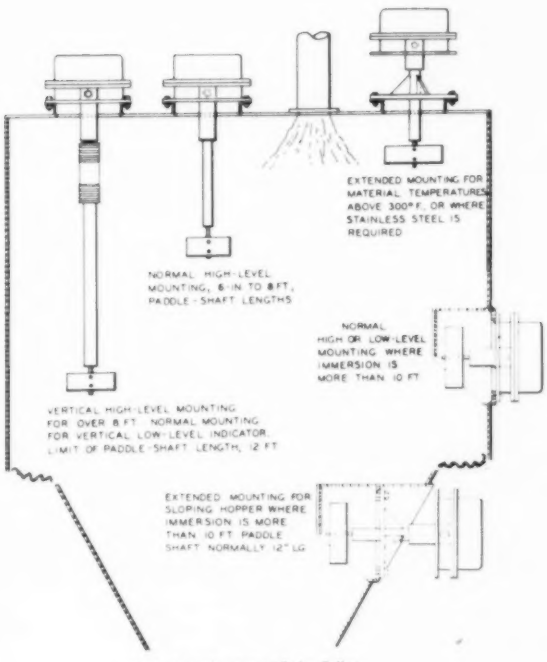
● One unit in the completely new line of V-6 and V-12 gasoline and diesel engines being presented for 1960 by the GMC Truck and Coach Division of General Motors Corporation is the DBW9000 shown here.

This model is one of the largest 6-wheel units in the line. It is powered by a GM 6V-71 diesel engine developing 210 hp., and has a 5-speed overdrive transmission with a 4-speed auxiliary.

A companion model, the BW-9000, has a hp. rating of 275 at 2,400 r.p.m., and a torque rating of 630 lb.-ft. at 1,600-1,900 r.p.m. It has a 5-speed, 2-speed transmission combination.

Both models have worm-drive tandem rear axles, with double-reduction tandems available as optional equipment. Both cabs have bumper-to-back-of-cab dimensions of only 90 in., facilitating dump or trailer operations.

In a program started four years ago, GM has revised its entire line of trucks, beginning at the drawing board, and including engine, chassis, and body design. Manufacturing methods and the machinery to make the vehicles were also changed. Interchangeable parts are used, making it possible for fleet operators to have a wide variety of vehicles and carry the minimum of replacement parts, repair tools, and service facilities. **(356)**


EXTENDED MOUNTING FOR MATERIAL TEMPERATURES ABOVE 300° F. OR WHERE STAINLESS STEEL IS REQUIRED
NORMAL HIGH-LEVEL MOUNTING, 6 IN. TO 8 FT. PADDLE-SHAFT LENGTHS
NORMAL HIGH OR LOW-LEVEL MOUNTING WHERE IMMERSION IS MORE THAN 10 FT.
VERTICAL HIGH-LEVEL MOUNTING FOR OVER 8 FT. NORMAL MOUNTING FOR VERTICAL LOW-LEVEL INDICATOR. LIMIT OF PADDLE-SHAFT LENGTH, 12 FT.
EXTENDED MOUNTING FOR SLOPING HOPPER WHERE IMMERSION IS MORE THAN 10 FT. PADDLE SHAFT NORMALLY 12" LG.

Typical applications of the Fuller Material-Level Indicator.

● Two material level indicators, one designed for hazardous dust locations, and one for general purpose use, are being offered by the Fuller Company.

The models are identical in operation and dimensions, and contain interchangeable parts and wiring, except that Model SG-4 (general use) contains a gasket between the cover and the body, while Model SG-4X (hazardous dust locations) has metal-to-metal surfaces, and a paddle-shaft bushing machined to UL specifications.

The indicators are used to indicate the level of pulverized, fine, crushed, or granular materials (maximum 1 in.) in bins and silos. They also control such equipment as feeders, valves, elevators, and conveyors by stopping the motor driving the equipment when a predetermined level is reached. **(357)**

● Hydra-Might is a new hydraulically actuated percussion-type rock drill developed by the Hydra-Might Company, a division of Florida Builders, Incorporated.

The drill, which uses oil, is capable of moving a hammer at a rate of 1,800 blows per minute by means of a single self-propelled, compact unit which operates completely on hydraulic pressure. The action reverses the direction of the oil flow 60 times per second. It does not require a large compressor or air motors for propulsion.

The machine cuts granite at a rate of 15 to 20 in. per minute, with a 2¾-in. bit. The designers expect to further raise this speed, as this is the first productive prototype, and has been in operation only since December, 1959.

Because the drill maintains steady pressure against the hammer until after contact is made, there is no heating of the rod or bit. This adds longer life to drilling rods. During tests, one piece of drill rod was run over 6,000 ft.

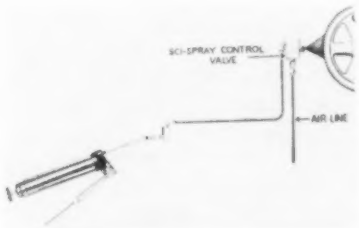
Other advantages offered by the unit are noise reduction and mobility over long distances. The boom operates in numerous positions, ranging from vertical to horizontal.

There are two models, the SBR-1, built around a Farmall 560 tractor, primarily a contractor's rig, and the SBR-2, primarily for quarrying. The SBR-2 is designed on a 3-wheel chassis—two wheels for propulsion, and a caster. One driving wheel can be run forward, and the other backward at the same time, giving accurate spotting. (358)

● A small rocket-jet torch has been developed by Linde Company, Division of Union Carbide Corporation, to shape stone.

Oxygen and kerosene, in an internal water-cooled rocket chamber, combine to produce a flame that reaches temperatures of 5,500 deg. F., at a velocity of 7,000 f.p.s. The combination of heat and velocity causes stone to spall.

In the picture an operator is carving a 1-ft. deep section out of one of the four large granite supporting piers of the Queensborough Bridge in New York City with the torch, Oxweld FSJ-6. (360)



● An innovation in the spray lubricating of industrial gearing has been announced by Farval Division of Eaton Manufacturing Company.

When inaccessibility of gears presents a danger to maintenance personnel, this spray system reportedly offers an inexpensive, efficient method of lubrication. With a hand grease gun attached to a conveniently located fitting, the lubricant is sprayed as long as pumping is continued. Lubricant pressure forces down a spring-loaded piston, thus opening porting to the Farval spray-control valve.

This allows air and lubricant, each under separate pressure, to be forced through the spray nozzle.

When lubricant flow ceases, the piston returns to its original position, closing the ports. The air supply is then shut off. (361)

● Gar Wood Industries are offering all-steel hopper trailers which are light in weight per capacity. The units are available nationally in a wide variety of semi-trailers and trailer trains, and with either open or closed hoppers.

The contours of the body shell give all required strength, eliminating the need and weight of re-enforcing members. Loading can be done with a front-end loader or shovel. Discharge is made in less than five seconds.

With air-power gates the hopper can be dumped on the run. Patented butterfly gates seal the load from dirt and weather. (359)

DOWN GOES CUT-IMPACT DAMAGE

with the New Nylon U. S. Royal Super Con-Trak-Tor S. R. T.*

Steel-Reinforced Tread*, with its thousands of steel filaments (that can't rust out), forms a virtually impenetrable mat between tread and body, provides exclusive new protection against cut-and-impact failures. Deeper tread at center and shoulders, *plus* Double-Strength Nylon, *plus* triple beads in 14.00 or over cross section, make the U. S. Royal Super Con-Trak-Tor® the world's toughest off-road tire, outperforming competitors by up to 95%. Don't settle for less on *your* jobs!

U.S. ROYAL SAFETY 1ST TRUCK TIRES

United States Rubber

Rockefeller Center, New York 20, N.Y.

ACCURATE AUTOMATIC FEEDING

from ounces to tons per hour

ERIEZ HI-VI VIBRATORY FEEDERS

Only feeders with totally enclosed drive element as standard construction. A-C operated, electro-permanent magnetic drive

Continuous, uniform flow of feed of all sizes and shapes of bulk materials for blending, mixing, sorting, cooling, etc. Variable feed rate. Completely automatic, extremely accurate. Increases production, provides quality control, reduces maintenance and operating costs.

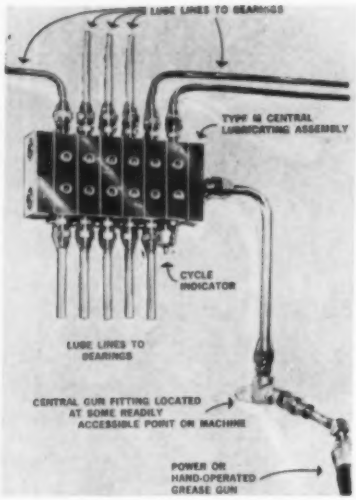
Fully enclosed drive element (standard—no extra cost) makes units dust and moisture resistant; ideal for sanitary applications. Break-resistant glass fiber springs • New patented magnetic drive provides greater feeding capacity than comparable size units • No rectifier needed • Simple installation • Factory pre-tested • Fully proved in plants everywhere

NOW AVAILABLE! . . . economical, specially constructed units for hazardous dusty locations . . . fully acceptable by Mill Mutual.

WRITE FOR FREE COMPREHENSIVE LITERATURE
Eriez Mfg. Co., 113-FB Magnet Drive, Erie, Pa.

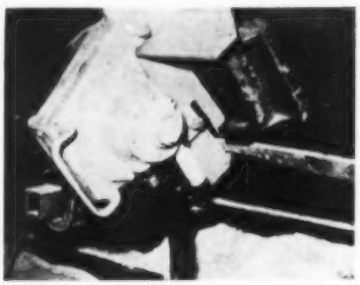
ERIEZ

Enter 66-A on card, page 197


LUBE LINES TO BEARINGS
TYPE M CENTRAL LUBRICATING ASSEMBLY
CYCLE INDICATOR
LUBE LINES TO BEARINGS
CENTRAL GUN FITTING LOCATED AT SOME READILY ACCESSIBLE POINT ON MACHINE
POWER OR HAND-OPERATED GREASE GUN

● A compact gun-operated system for centralized lubrication of small machinery, or for use where space does not permit mounting a manual or automatic pump, has been developed by Trabon Engineering Corporation.

Up to 16 outlets can be handled from a single "Type M" assembly, with outputs varying from .010 to .070 cu. in. of grease per cycle. A cycle indicator gives each bearing the required amount of lubricant. A central warning feature enables blocked conditions to be corrected before the bearing is lost. **(362)**



● Patent applications on a locking wedge mount for rotary vibrators, designed to eliminate the problem of "creep-out," have been filed by the Martin Engineering Company.

The new wedge mount engages in the female on hopper car chutes without need for blows from a heavy sledge. The positive lock-in of the wedge mounting gives better transmission of vibration.

Removal of the mount is done with a 2-lb. hammer swung horizontally. **(363)**

Most Complete Line Ever!

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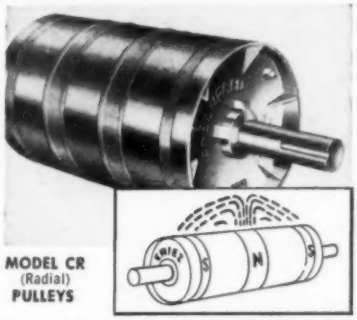
permanent non-electric Erium-powered* MAGNETIC PULLEYS

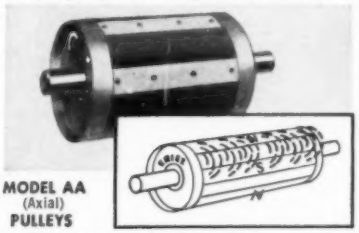
Now in 2 "duty-rated" designs—to give you the finest automatic separation for your exact application—fine iron or tramp iron removal.

NEW, EXPANDED LINE! New design, new magnetic efficiency permit increased operating range and effectiveness with 2 different magnetic actions. Peak protection for all operations—from rugged crusher protection through delicate product purification operations.



MODEL CR (Radial) **PULLEYS**

For removing large pieces of tramp iron from heavy depths of flow. Provides a strong, deep magnetic field of equal intensity around the full periphery. 12" through 36" diameters.



MODEL AA (Axial) **PULLEYS**

Excellent for nne iron separation, as well as small and medium pieces of tramp iron, in average material flows! Strong magnetic field of equal force extends across the full width of the pulley. 8", 12", 15", & 18" diameters.

Prevent product contamination, machinery damage, fires, explosions, downtime. 2 designs, 4 magnetic strengths, 8 diameters, 14 belt widths. No operating or maintenance costs. For all materials, wet or dry, on belts of non magnetic material. Fast, simple installation.

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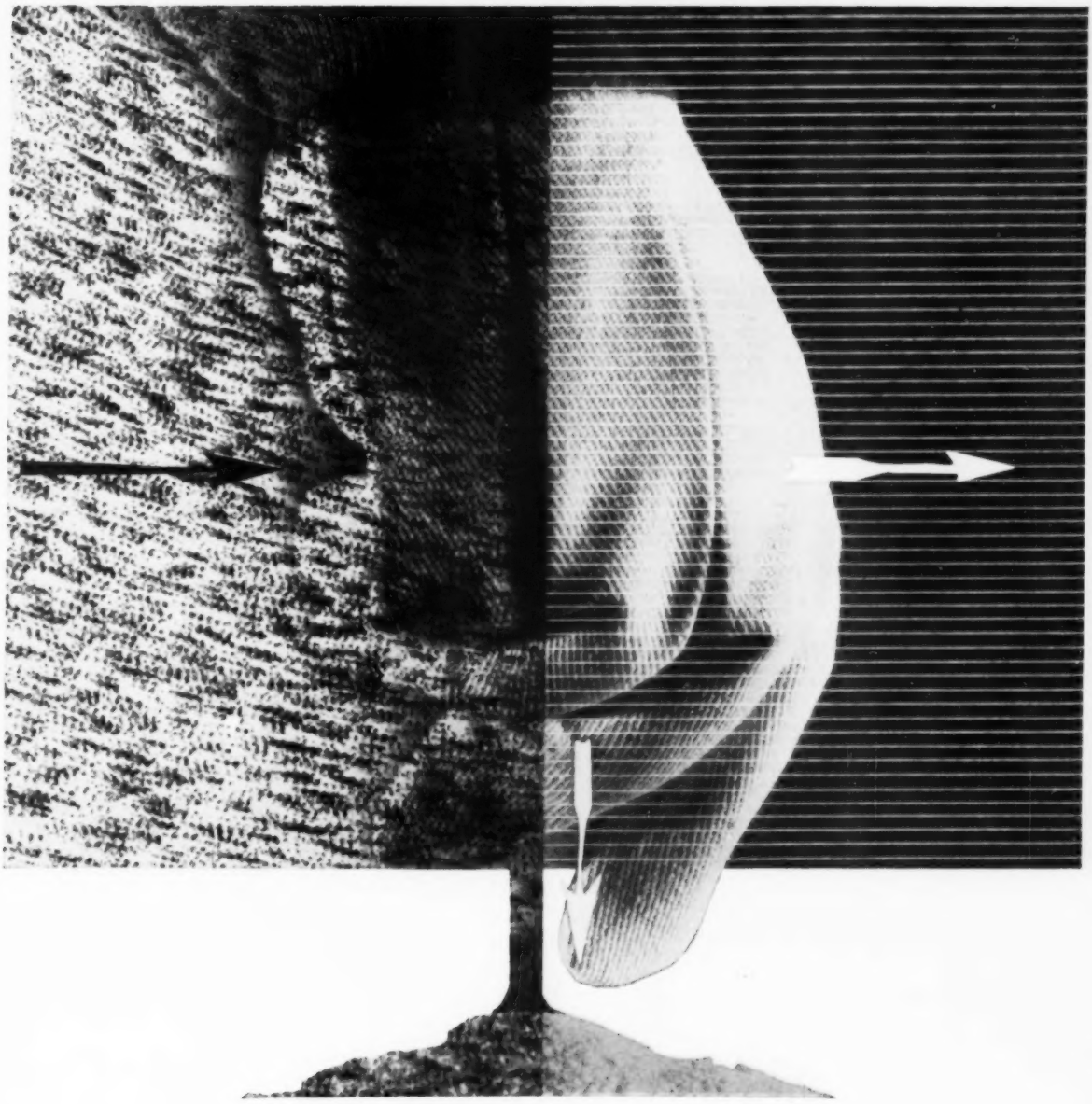
New fact-filled 6-page bulletin has installation photos, selector guide, etc. Write today! Eriez Mfg. Co., 113-FA Magnet Drive, Erie, Pa.

ERIEZ

Enter 66-B on card, page 197



Dust collectors from American-Standard* Industrial Division are widely used in plants across the country today to recover valuable materials and control costly air pollution. The reason: a long reputation for dependable collectors for every degree of efficiency, in a wide variety of sizes and arrangements to meet your individual needs—including the latest electrostatic precipitators. Why not talk over your collection problem with one of our product specialists. You'll find his experience invaluable. We have offices in all principal cities. American-Standard Industrial Division, Detroit 32, Mich. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.

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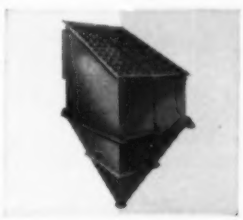

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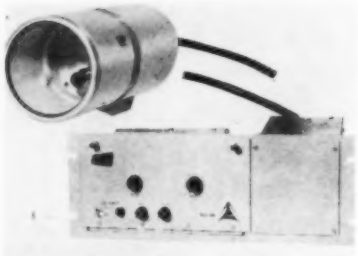

● Development of a television camera, designed to be rugged enough to withstand shock, vibration, noise, salt spray, and other extremes of environment without an auxiliary protective housing, has been announced by the Dage Television Division of Thompson Ramo Wooldridge Incorporated.

This unit, Model RGS-10, consists of a camera and camera control capable of being operated up to 2,000 ft. apart. The camera is 16 in. in length, 6⅞ in. in diameter, and weighs 15 lbs. The control is 7 x 19 in. and weighs approximately 15 lb. Camera and control unit are completely transistorized, with the exception of the camera's vidicon tube.

Plug-in modules facilitate change of function and service. The camera has automatic light control over the range of 2,000:1, a built-in 4-lens turret, and horizontal resolution of more than 700 lines. It will operate at from —20 deg. F. to +160 deg. F., and in noise levels of more than 185 decibels. **(364)**

● Improved sliding action in the Select-A-Point adjustable underconstruction is achieved through the use of new, lubricated bronze bearings, according to the manufacturer, Fruehauf Trailer Company.

Select-A-Point reportedly allows an operator to change tandem locations and balance his cargo in minutes. The mechanism is adaptable to either new or earlier Fruehauf trailer models. The operator has a choice of 14 locations for the tandem, over a 78-in. range, in 6-in. increments. **(365)**

CHECK LISTING of available TECHNICAL LITERATURE, p. 197

"...he can continually view the formation of the clinker"

(at Ideal Cement Company's Houston, Texas; Ada, Oklahoma; and Tijeras, New Mexico, plants)

One man at each of these three new Ideal plants can continually check the kiln burning operation using Diamond TV. Thorough instrumentation plus this continuous visual checking gives him close control over the manufacturing operations. And, because he constantly watches the clinker formation, the operator can make prompt adjustments as needed . . . helping to make possible a better product at lower cost.

There are many other ways you can utilize Diamond TV — such as in quarrying and crushing operations, viewing conveyor belts, at transfer points and in storage and shipping operations.

Why not let Diamond's trained application engineers show you how cost cutting Diamond industrial TV can bring greater efficiency to your own plant operation? Request Field Survey FS14A. Phone Lancaster, Ohio, OLive 3-6540 or TWX 490 — TODAY.

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Diamond® Electronics

DIVISION OF DIAMOND POWER SPECIALTY CORPORATION

LANCASTER, OHIO

Enter 69 on card, page 197

● The "Michigan" Model 180 tractor dozer, manufactured by the Construction Machinery Division of Clark Equipment Company, has undergone a number of design changes, all aimed at increasing machine productivity.

The diesel-powered, 162-hp. unit, smallest in the Michigan line of rubber-tired tractor dozers, now has

all features standard on the two larger units, including the Michigan power train.

These changes include: (1) a new blade containing a built-in push plate that permits the 180 to be used as a dozer or a pusher; (2) two double-acting hydraulic cylinders added to the dozer blade push arms; (3) the wheelbase lengthened 12 in. (over-all length is now 19 ft. 6 in.); (4) two double-acting hydraulic cylinders used for steering, instead of the single cylinder previously used. **(366)**

● An elevating trailer for all-purpose cargo handling, that lifts its own load in 40 seconds, is available from the Trailevator Division of Magline Incorporated.

The 2,000-lb capacity Trailevator has a hydraulically operated bed which lowers to receive a load at ground level, then lifts and locks into hauling position. Among the features are a patented load-leveling device which assures level elevation or descent, independent wheel suspension, and dual leaf-type springs.

The tailgate forms a heavy-duty loading ramp, as well as a secure box closure. The trailer does not need to be detached from a towing vehicle for loading or unloading. The bed will hold for loading at any level, from ground to hauling position. It is available as a steel panel unit, or with stake rack sides. **(367)**

● Bigger legal payloads and minimum maintenance are among the advantages reported by using the 24-ft. steel dump bodies with lightweight aluminum dump trailers manufactured by Hercules Steel Products Company.

Dead-weight difference between the new aluminum bodies and steel

units is 2,500 lb. The aluminum bodies are less easily damaged, and need no painting. **(368)**

● The 12-in. dredge, model CDR-12B, pictured here, is capable of producing 370 cu. yd. of mixture per hour containing 30 percent solids. It is one of a line of completely hydraulic dredges offering great portability which are available from the Service Machinery Corporation.

The dredge responds instantly to changes in speeds and powering to accommodate momentary conditions that crop out in handling nonuniform materials. An engine driven rotary-type hydraulic oil pump provides power for hydraulic motors to drive the cutter and winches. The dredge pumps are engineered to the requirements of the dredge owner and operator from a selection of 17 different dredge pumps. It is, reportedly, amply provided with safety features. Easy assembly and replacement of parts by units were planned for in design.

The machine is recommended by the manufacturer for jobs at sites inaccessible to most dredges without extensive dismantling. It needs only enough water area to float it initially. In addition to its portability it cuts, digs, conveys, and loads or delivers earth material, as required, to disposal fields, hoppers, classifier screens, or dewatering equipment. It handles, among other materials, gravel, nonmetallic solids of many types, and sand of all kinds and sizes.

The readily portable production models of this manufacturer range from 6-in. up to and including 16-in. dredges, as well as dredges engineered to meet specific requirements. The diesel hp. ratings are from 700 to 1,500, including a 12-in. heavy-duty rock cutter of the fully portable type. Complete assemblies consist of gantry, frame, spuds, flotation deck tanks, "A" frame, and ladder. **(369)**

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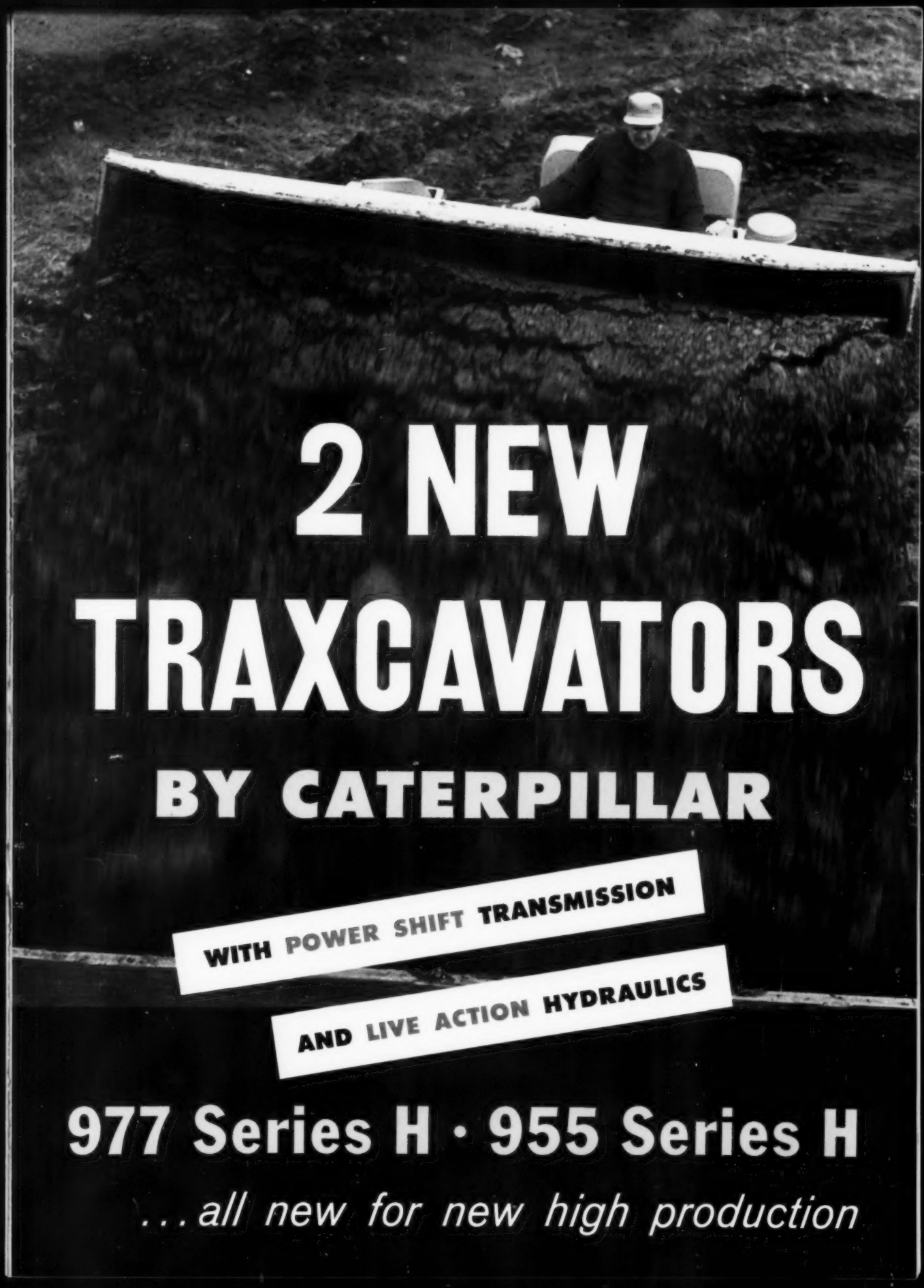

2 NEW
TRAXCAVATORS
BY CATERPILLAR
WITH POWER SHIFT TRANSMISSION
AND LIVE ACTION HYDRAULICS
977 Series H · 955 Series H
...all new for new high production

FASTER loads...lifts...hauls...

New Cat Series H Traxcavators!

There *is* a way to beat higher costs—and that's with increased production. For tractor-loader jobs, here's your answer in the new Caterpillar 977H and 955H Traxcavators. Designed to set a production pace far faster than the models they replace and any other tractor-loaders of comparable size, they're milestones in tractor-loader progress. With Cat power shift transmission and Live Action Hydraulics, they're machines that never stop. Look at the action pictures here and you'll see why. That's the 150 HP 977H with its 2½ cu. yd. bucket working. The 100 HP 955H with its 1¾ cu. yd. bucket is equally spectacular. Listed here are some of the features that make these machines the fastest working tractor-loaders ever built. For complete details, see your Caterpillar Dealer.

.00 sec.

READY TO GO. With the range selector in low, the operator has only to use the power shift lever for split-second changes of speed and direction. Between the range selector and the power shift lever, the new 977H has 4 speeds forward and 4 faster in reverse. However, for the average job, only the power shift becomes the operating lever. Automatic tilt control has positioned the 2½ cu. yd. bucket for digging.

4.2 sec.

FASTER LOADING. With 150 HP at the flywheel and an operating weight of 36,270 lb., the 977H develops up to 72,000 lb. push at converter stall without stalling the engine—push aplenty to break out big loads. Live Action Hydraulics deliver increased digging power to operate the bucket with greater speed and force for faster loads. The material here is an earth and gravel mixture, up to one inch in size.

13.2 sec.

FASTER HAULING. Using a light touch on the power shift lever to reverse instantly and pick up haul speeds, the operator returns at 4.0 average MPH over a total distance of 48 feet to the truck. Because the new 977H is heavier than the previous model and its center of gravity is 10% further to the rear, it has greater stability to handle with ease the heavier loads in the new 2½ cu. yd. bucket.

dumps . . . cycles!

18.0 sec.

FASTER DUMPING. The 977's bucket reach of 39½" at 9' 4" dump height easily clears this 7' 8" high, 10 cu. yd. truck. With this reach, the operator can cast the load where he wants it without time-wasting jockeying. Automatic kick out on the lift controls further reduces bucket maneuvering time. Dumping completed, the operator moves the power shift lever for instant return toward another load.

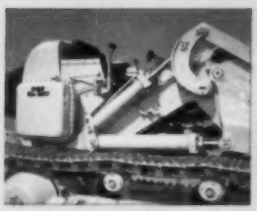
26.4 sec.

FASTER RETURN. With a return time of 8.4 sec., the total cycle time for the 977 was 26.4 sec. In a typical job study, the average cycle time per truck load was 117.6 sec. In 60 minutes the 977H loaded 30.6 trucks with a total of 306 cu. yd. This is typical of the outstanding performance you can expect from the 977H – and, in its capacity, from the 955H. Nothing in their size range can match the Traxcavators that never stop for fast cycles and high production!

NEW POWER SHIFT TRANSMISSION

One lever—that's right, one lever gives split-second changes in speed or direction to slash cycle times and increase operator efficiency. This Caterpillar exclusive was designed especially for the 977H and the 955H.

NEW LIVE ACTION HYDRAULICS



Another Caterpillar first. Live Action Hydraulics provide faster lifting speed and greater lifting capacity without robbing power from the tracks. The 977H packs 41% more hydraulic lifting power—955H, 23% more than former models.

MORE HORSEPOWER WITH NEW CAT TURBOCHARGED ENGINES

Up 50% on the 977H—its new Cat D333 Engine develops 150 HP at the flywheel. Up 43% on the 955H with a new Cat D330 Engine that develops 100 flywheel HP.

NEW INCREASED BUCKET CAPACITY

An 11% increase on the 977H with new 2½-cu.-yd. bucket—and a 16.6% increase on the 955H with new 1¾-cu.-yd. bucket. To handle the heavier loads, bucket linkage on both machines has been strengthened.

NEW HEAVY-DUTY UNDERCARRIAGE

Built to stand up under the toughest jobs, the new undercarriage on both machines features larger, stronger track components that also increase stability . . . lifetime lubricated rollers that need no lubrication until rebuilding . . . and track guiding guards welded to the roller frame for positive track alignment. The 955H also features a new 6-roller track frame.

FAST TRAVEL SPEEDS

977H . . . Forward		955H . . . Forward	
Low	High	Low	High
2.0 MPH 1st	2.5 MPH 1st	2.1 MPH 1st	2.7 MPH 1st
3.6 MPH 2nd	4.7 MPH 2nd	3.9 MPH 2nd	4.9 MPH 2nd

Reverse speeds 25% faster than forward

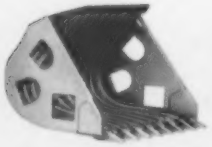
MORE HIGH PRODUCTION FEATURES

Other features on both machines include a new, two-cylinder high-speed gasoline starting engine for positive starts in any weather . . . and a new, dry-type air cleaner that removes 99.8% of all dirt from intake air even in the worst dust conditions, cuts maintenance time as much as 75%. Retained features include 40° bucket tilt back . . . automatic bucket positioners and kick out . . . 3-grouser track shoes . . . and quick-change attachments that multiply the machines' usefulness.

PACE-SETTING POWER PLUS VERSATILITY

in the new Cat Series H Traxcavators

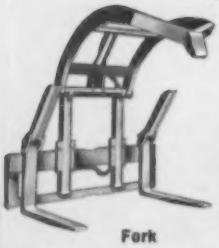
SIDE DUMP BUCKET Directly interchangeable with the standard bucket, the side dump bucket provides increased versatility for Series H Traxcavators. It eliminates turning and requires less loading space – to sum up, lowers cycle times for even greater production. Capacities: 977H – 2⅝ cu. yd.; 955H – 1¾ cu. yd.



Rock Bucket

Quarry Bucket

Bulldozer



Fork

Ripper

You've seen how increased horsepower, power shift transmission and Live Action Hydraulics make the new 977 and 955 Series H Traxcavators the fastest working tractor-loaders in the field. That means higher production for you not just on one job application, but on many—because of the many attachments available with both machines. Bar none, Traxcavators are the most useful machines you can own. With attachments, you can always keep them working—and working *profitably*.

Have you checked your equipment line-up recently? There may be machines in it that are no longer paying their way—or not earning *all* the profits they should in light of today's more efficient units. A comparison of your existing tractor-loaders with the new Series H Traxcavators might easily prove these new machines would increase your output and profits far more than you imagine.

Get the down-to-earth facts about the new Series H Traxcavators from your Caterpillar Dealer. Better still, ask for a demonstration. See for yourself how they set a new production pace on the toughest kind of job!

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

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BORN OF RESEARCH PROVED IN THE FIELD

Washington News Letter

(*Continued from page* 11)

question. Rental housing is notoriously expensive. If the demand can be expected to last for only a small number of years, it may not turn out to be a very attractive investment.

The most encouraging factor indicated by the Commerce Department analysis is that the older age groups in the population are moving back from home ownership to renting. Here, again, the question of whether this new source of demand can be regarded as reliable depends on whether the incomes of the older groups in the population will be maintained. Optimism in this regard may be warranted, principally because of the very rapid spread of pension programs in the last decade.

Although the usual benefits of these pension plans, even when added to Social Security benefits, are not yet large enough to maintain the average pensioner at a relatively high standard of living, the trend is clearly in the direction of providing sufficient income to permit him to maintain a level close to that of his former standard. If this happens, the prospects that rental housing will continue to be profitable are very good indeed.

Finally, this report warns that although the long-run trend is buoyant, there is no reason to expect that it will continue upward every year. It points, clearly, to the rapid changes in the volume of construction, year to year, which result not from any change in the basic needs for housing of one form or another but, rather, from the vicissitudes of the mortgage market.

The report notes that each of the post-war booms in housing has occurred immediately after a recession, when mortgage money was relatively available on reasonable terms. However, when other industries began to bid for the available loanable funds, thereby driving the interest rate up, the volume of housing declined, despite the fact that there was an improvement in the general economic situation. The most reasonable conclusion is that ups and downs of this kind will continue.

This pattern is regrettable, principally because it prevents the housing industry from becoming a stabilized and efficient industry. Volume and profits are less related to efficiency of production than to the completely extraneous factor of the availability of mortgage money. This is not the way to maintain a stable industry with stable management which will be satisfied with moderate but steady profits. It encourages speculation rather than production as the basis for making a profit. It could well turn out that the speculators of the 1960's will become the beneficiaries of the baby boom in the 1940's.

Federal-Aid Highway Awards Favor Smaller Concerns

According to a report released by the U. S. Bureau of Public Roads, 6,743 Federal-Aid highway construction contracts were awarded in 1959.

To implement the intent of Congress and aid in developing the potential capacity of small businesses, 29 percent of these contracts were awarded for amounts less than $50,000; 17 percent for amounts ranging from $50,000 to $100,000; and 23 percent for amounts between $100,000 and $250,000. Only 670 (less than 10 percent) of the contracts were for more than $1,000,000.

N.C.S.A. Publications Available From Washington Office

According to the National Crushed Stone Association *Bulletin*, copies of the N.C.S.A. *Accounting Manual*, issued last year, are still available. Price to members of the association, $5 per copy; to nonmembers, $15.

Copies of the public relations brochure released last year are also available, at 20 cents per copy. These and the *Manual* may be obtained from the National Crushed Stone Association, 1415 Elliott Place, N.W., Washington 7, D. C.

Canadian J-M Mine Cited For Winning Safety Score

An Award of Honor was presented to the Canadian Johns-Manville Jeffrey Mine, reportedly the world's largest asbestos mine, for breaking the all-time safety record in North America for underground nonmetallic mining.

The award was made by the National Safety Council in Asbestos, Quebec, by W. G. Johnson, general manager of the Council. The 1,800 J-M employees at Asbestos worked 2,660,079 man-hours without a lost-time accident.

The Hudson River Concrete Products Corporation has reopened the quarry located south of Ravena, N. Y., and is operating it through a newly-formed firm known as the Hudson River Rock Corporation.

During March, 1960, according to the U. S. Bureau of Public Roads, contracts for an estimated $135 million were let, involving 183 miles of interstate construction including 185 bridges. Preliminary engineering and right-of-way acquisitions to the extent of $11,760,000,000 were authorized in March.

LESCHEN WIRE PORTER ROPE DIVISION
H. K. PORTER COMPANY, INC.
Enter 75 on card, page 197

Labor Developments

(*Continued from page 13*)

in October we were told by our chairman that the agreement was made at a meeting between management and our union without our consent being sought. It is evident that there has been conspiracy and fraud from the beginning to the completed agreement. We want an investigation of both parties. . ."

"He doesn't agree with actions of the union officers, so they threw him out of the meeting hall on the grounds he had not paid his dues, even though he showed a paid-up dues card, stamped and all . . ."

"They have a preferred hiring list where I work with (so many men) on it who are the only ones called for the better jobs. We cannot say anything at a meeting. If we do, we are hammered down as out of order . . ."

Other similar quotations from letters of complaint are included in the report; and, of course, there are many more files of the Labor Department.

The heart of the program to which this legislation is devoted is not so much corrective as preventive. The prevention of difficulties like those above is accomplished by the reporting program. The labor organization information report provides a description of the structure, the constitutional provisions, the operating rules, and the procedures for democratic processes of the labor organizations affected by the law.

Of special interest is the fact that, in filing their reports, a number of unions stated that they were in the process of changing their constitutions and bylaws to conform to the provisions of the Act.

Furthermore, labor organizations are required to file annual financial statements within 90 days after the end of their fiscal year, which, for many unions, coincides with the calendar year. For this reason, not many reports have been received. However, when they do become available, they will make very interesting reading, not only for the trade union members, who, frequently for the first time, will find out how much money has been received by the union and something about how it has been spent, but also for employers, who deal with those trade unions.

One of the devices used to prevent trade union democracy was the use of trusteeships, that is, arrangements whereby the local officers were removed and the international headquarters sent its own appointees in to administer the affairs of the union. In the most reprehensible cases, these trusteeships continued indefinitely.

Here, too, the new law requires that parent organizations report within 30 days on all subordinate bodies over which trusteeship has been assumed. As a consequence, thus far, 552 of these reports have been submitted and, more importantly, 103 trusteeships have been listed since the law became effective.

For those 103 local unions the opportunity for a democratic organization has been restored. Whether, in fact, such democracy will result depends entirely on the actions of the local members. If they continue to be uninterested in the affairs of their union, very little will have been accomplished in their behalf by this law.

Other reports are also required, each designed to uncover a real or a potential abuse. Not much has been done with these as yet; and the report of the Secretary of Labor therefore has very little information about them. However, it is clear that the operation of this new labor law has already laid the foundations for eliminating or preventing improper practices on the part of labor organizations.

As indicated above, the law cannot do much more than lay the foundation. The building of a sound structure on this foundation will depend almost entirely on whether union members accept the invitation to participate again in the direction of the affairs of their oun unions.

Saskatchewan Cement Plant Completes Expansion Program

To ensure an adequate supply of cement for the South Saskatchewan River and Squaw River dams and other industrial projects, Saskatchewan Cement Company recently completed a $1,000,000 expansion program. The plant, located on a 300-acre site, two miles north of Regina, cost $8,000,000 when it was erected in 1955. The expansion has increased capacity from 1,100,000 bbl. to 1,300,000 bbl. annually.

A major portion of the cost of the expansion, about $500,000, went into the new grinding mill. An electrostatic dust collector was installed at a cost of $250,000.

Operation was resumed last March after a three-month shutdown during the installation of the new equipment.

Colorado Initiates Survey To Locate New Gravel Beds

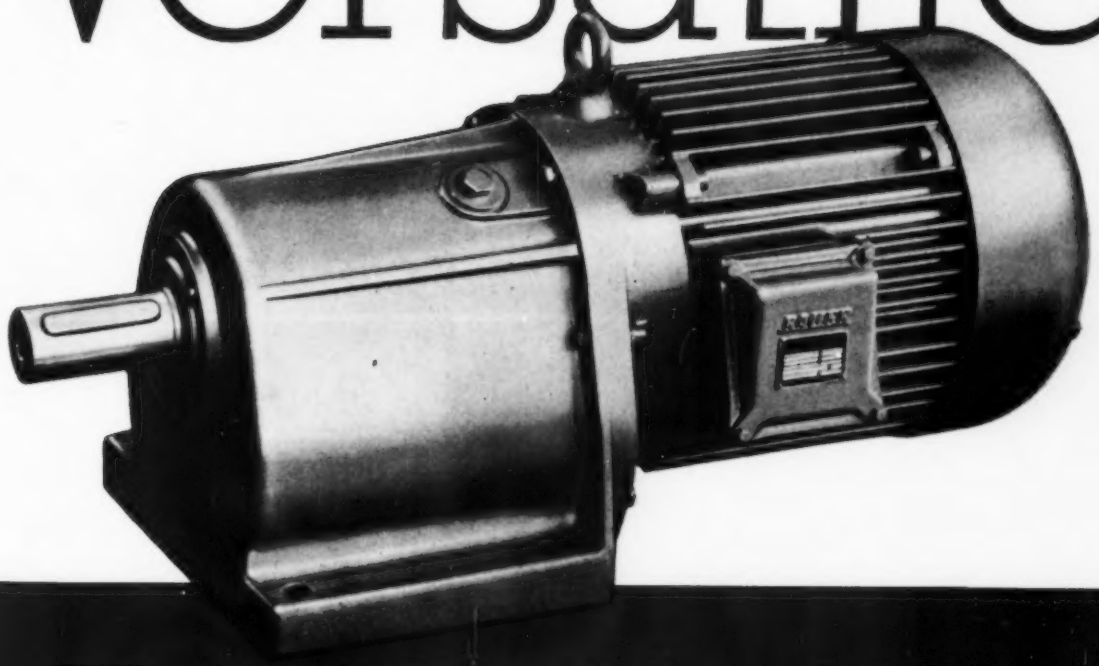
The Colorado State Highway Department has launched a $15,000 search for gravel pits in the eastern part of the state to provide coarse aggregates needed in paving. Road builders now must ship coarse aggregates from Denver—90 miles from some jobs—to build highways in the eastern part of the state. These hauling fees add substantially to highway costs.

If the survey locates one gravel pit in the right area, the department will save "hundreds of thousands of dollars," says Emil G. Swanson, staff materials engineer. Through this study, conducted in co-operation with the United States Bureau of Public Roads, it is hoped that gravel deposits not revealed in previous surface explorations in the area will be discovered.

The Tionesta Sand and Gravel Company recently purchased two barges and a tug to aid in the removal of sand and gravel from a five-mile stretch of the Allegheny River near Tionesta, Pa. The firm's state and federal permits cover both dredging and streambed deepening.

A general pay increase boosting the basic wage to slightly more than $2 per hour was granted recently to workers at the Lehigh Portland Cement Company's Flagler plant near Bunnell, Fla. About 235 persons are affected by the new pay scale.

Versatile



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The Editor's Page

Liming Needs Public Support

THE continuing low level of demand for agricultural limestone is a serious but apparently little known or appreciated threat to this country's agriculture and to public health. That agstone or lime is necessary to keep our soil productive and to provide the vital mineral content in our food is known to our experts, but apparently not to those who control the extent of its use. The use of agstone is being actively promoted by state agricultural college experiment stations, county agents, soil conservation service technicians, fertilizer and seed companies, and the agstone producers themselves. There is ample proof of the need for more liming of our soil, and yet the amount done is only a fraction of what is needed to keep the soil in its present condition, much less improve it.

Efforts to sell agstone direct to farmers were not very effective until the federal payment program began. Sales, which until the early 30's had never exceeded 3,500,000 tons annually, shot up to 30,000,000 tons. After a few years, however, a downward trend began, and in some years even the modest amount of government support was not fully utilized.

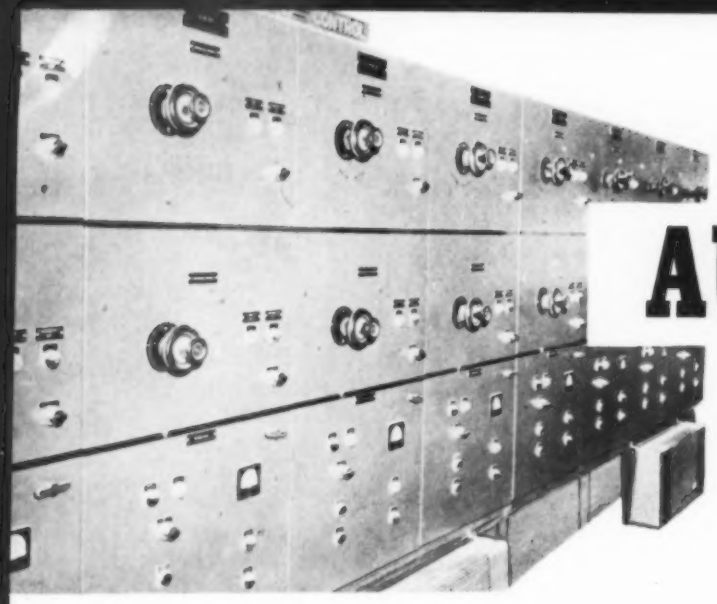
AMONG the reasons advanced for this low level of demand have been: program restrictions and bottlenecks which discourage farmers from participating; producer apathy towards greater aglime sales; lack of conviction among farmers of the essentiality of liming; and low farm income. Some of these handicaps have been partially corrected, but with no appreciable results. It is doubtful that their further correction would be of much help.

While the demand for agstone has remained at a low level, the sale of fertilizer has increased rapidly. Everyone knows that fertilizers are necessary for crop quantity and quality. What everyone doesn't know is that lime is necessary in order to get the full benefit from fertilizers, and that in many cases they are ineffective without lime. As a result, the fertilizer manufacturers and the seed companies are among the most active promoters of the use of agstone.

IN the last issue, the May Lime and Agstone Number of PIT and QUARRY, there were three articles by well known soils extension agronomists from the state universities of Illinois, Pennsylvania, and Vermont. These are states with widely different agricultural conditions and agstone specifications. Each of these authorities was invited to write an article on what he considered the most important problems facing the liming program in his area. Each of them had much of interest to say, but they all stressed the necessity for doing a better job of selling the importance of soil liming to all concerned, especially the public.

What is needed, apparently, is a united public demand that the soil on which the future of this country depends be kept productive, and that the food we eat provide us with the calcium and other minerals necessary for our health. It has been proved over and over that when public opinion is aroused, government action soon follows. Intensive efforts to educate the public on this subject should be made by all interested parties.

Walter E. Trauffer



AUTOMATED CONTROL

By BUREN C. HEROD

AN OVER-ALL VIEW of the Consumers Company plant which was built in two phases. No. 1 included the primary crusher installation, left; the secondary crushing stage, center; and the surge installation, right. Phase 2 involved all the facilities seen in the background above the quarry floor, including the scalping tower, tertiary crushing, the screening plant, and the loadout bin building.

ANOTHER ON THE SPOT report

THE "old red barn" is gone. With the demolition of that landmark on Chicago's south side, and its replacement with a new 1,500-t.p.h. crushing and screening plant, considered the largest and most modern in the Midwest, Consumers Company Division, Vulcan Materials Company, closed out the first half century as a leader in the crushed stone industry and is off to a running start toward new heights in the second.

As indicated by company officials, the new McCook, Ill., plant is a "symbol of determination to keep up with the times"—nearly $6,000,000 worth of determination. Actually, the statement is a rather modest one. In several important details, the new operation doesn't merely keep up with the times, but displays features that represent considerable thought and planning; it should be a bulwark against obsolescence for many years to come.

Like many older operations, the former plant was "out of step" with present markets and their tighter specifications. Space age construction has had considerable impact on design criteria and consequent demand for premium materials in everything from pavements to prestressed concrete applications.

Core of outstanding operating design in new 1,500-t.p.h. crushed stone operation

Production of such materials requires highly flexible processing. In the quest for this objective, and with a faith in the future growth of Chicago, the plans for the new plant were born.

Complete electric and electronic control, coupled with peak automation, comprised the core of a design aimed at the aggregate producer's Utopia—high production with low unit cost.

How close did it come? At its design capacity of 1,500 tons—a figure which is routinely exceeded in normal operations—the new plant produces more than twice as much as was possible with facilities in the "old red barn." Alongside this 100 plus percent jump in capacity stands what is in effect a 50 percent reduction in a major cost center—labor. Although the new plant was designed to provide twice the former output with the same labor force, manpower requirements have actually been somewhat less.

With this outstanding operation, the company solved the problem of trying to accommodate expanding market demand while handicapped by rising costs and inadequate capacity and flexibility in a virtually obsolete plant. The existing high rate of construction in metropolitan Chicago was not the sole stimulus. The potential demand for an extremely wide range of aggregates in highway, home, street, and industrial construction in the area served from McCook was of equal significance.

First steps toward meeting these objectives were undertaken about four years ago with preliminary studies on replacement of the old plant. Out of these studies evolved the plan to construct a new and larger facility on the site of the old. However, it was decided that the most economical quarry haulage dictated installation of the primary and secondary crushing operations in the quarry proper, plus acquisition of larger trucks.

With finalization of the general plan by management, in consultation with Western-Knapp Engineering Company, the latter was awarded the contract for detail design, engineering, and construction. W.K.E. construction crews moved onto the site in March, 1957, and due to careful planning and co-ordination between the company and Western-Knapp engineers, production was never stopped from the time the extensive and complex project was initiated until its completion last fall.

During this time the "old red barn" was virtually surrounded by construction in progress on the various structures for the new tertiary crushing, screening, and loadout installations.

Design and Construction Several examples of trends in various phases of modern plant design are found in the overall layout. Undoubtedly, the most significant of these is the high degree of automation and central control which, as noted earlier, has permitted twice the former production rate with no increase in manpower. A virtually unlimited potential in product sizes was another major goal reached in the control design.

A HISTORIC LANDMARK gave way to progress. Where this "old red barn" stood, there is now a complex of modern processing technology, producing 1,500 t.p.h. or more of premium crushed stone materials in an almost infinite product range.

THE PRIMARY CRUSHER BUILDING was constructed in a cut descending 90 ft. below the quarry floor. See the cross-section drawing for a perspective of the 54-in. gyratory crusher and other components in this installation.

Features of the latter are discussed in detail later, along with the particular processing stages involved.

In its construction, the plant was built in two phases which correspond to the trend toward independent operation of quarry and plant. The first phase, rated at 1,500 t.p.h., included the primary and secondary reduction stages, and a following surge installation. The second phase (1,200 t.p.h.) involved the screening and tertiary crushing plants and the loadout bin structure.

Each of the above stages was designed as a separate operation and each is housed in its individual structure. In one instance, the screening plant, operation is further divided to "coarse" and "fine" sizing, and each of these was designed with two screening lines to allow the plant to operate efficiently at a reduced rate.

Another of the larger design features involves the primary crusher installation, which was built at the deep end of an inclined cut that reaches the depth of 90 ft. below the quarry floor. This cut was made in a central location to provide approximately equal haulage distances from current and future operating faces.

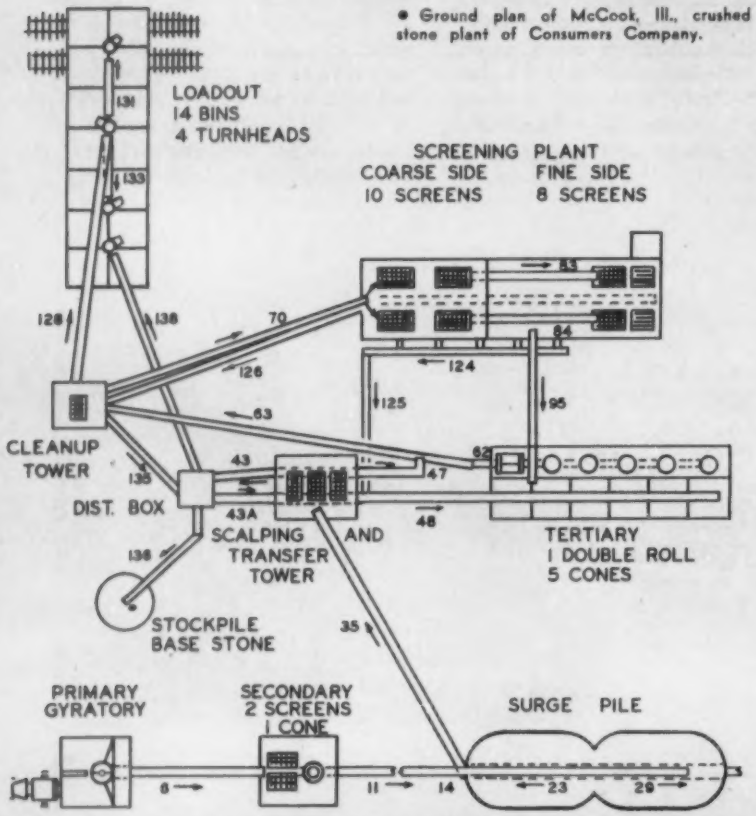
The final section of Phase 1, the surge installation, is in effect two units. Two conveyors, installed tail pulley to tail pulley and operating in opposite directions from the center, are housed in the reclaiming tunnel below the surge piles. The latter are separated above the tunnel by dead storage, but are supplied with appropriate quarry-run material by the same tripper conveyor. This arrangement was made to permit supplying a customer's lime plant, on an adjoining tract, from the same surge installation. Material for the aggregate plant and for the lime operation are obtained from separate sections in the quarry.

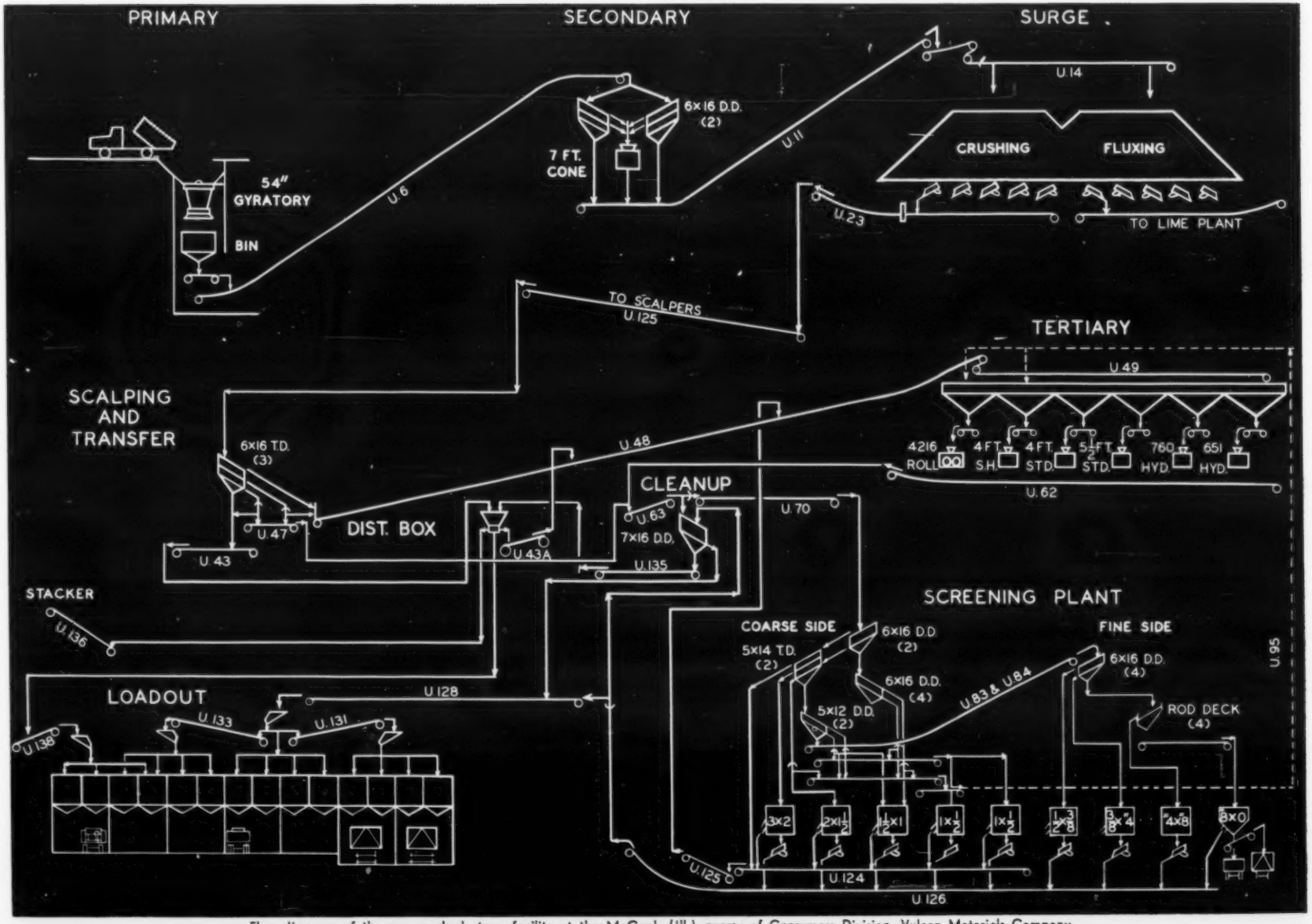
While the large components draw first attention, there are many less obvious but equally important details in the overall design. This includes the use of centrifugal switches on conveyor units, thus precluding the startup of each succeeding conveyor in the interlocked sequences until its predecessor has attained operating speed and can handle full feed.

In an important personnel safety feature, airplane cable trip wires are installed not only along the conveyor walkways, but also down the full length of the gravity take-up extensions. A major item for protection of equipment is the installation of clogged-chute limit switches at discharge points of major conveying lines.

The quarry circuit grounding system is another important feature designed for personnel safety. The neutral of the secondary wye-connected transformer feeding the quarry circuit is grounded through a 50-amp. current-limiting resistor, and a 2-ohm (maximum) ground-return cable is run from the ground side of the 50-amp. resistor to the

• Ground plan of McCook, Ill., crushed stone plant of Consumers Company.





Flow diagram of the new crushed stone facility at the McCook (Ill.) quarry of Consumers Division, Vulcan Materials Company.

frame of each portable electrically-driven machine.

The combination of 50-amp. maximum ground-fault current, and 2-ohm maximum ground-return impedance, limits the voltage between the portable equipment and adjacent earth during a ground fault to 100 volts. Upon occurrence of a ground-fault, the pit circuit is automatically relayed off the supply system.

The detailed design work covering all stages involved nearly 600 drawings by Western-Knapp engineers, and construction involved further impressive statistics. Nearly 53,000 cu. yd. of rock was excavated in the two phases of construction. Footings, foundations, and other concrete work required over 7,700 cu. yd. of ready-mix, and utilized 560 tons of rebars. Approximately 7,000 sq. ft. of 7-in. thick prestressed concrete planks were used to construct the screening plant bins; these were supplied from the firm's large prestressing operations nearby. (See MODERN CONCRETE, May, 1958, p. 52.)

About 1,350 tons of structural steel were used in the erection of the various structures, and another 368 tons in fabricating the conveyor systems. Chutework and similar applications utilized nearly 390 tons of steel plate. A total of more than 140,700 sq. ft. of roofing, plus vinyl coated steel siding and transluscent fiber glass panels, were installed.

Construction Schedule In March, 1957, construction of Phase 1 got underway, and in December, 1958, break-in operations were initiated, with the flow being delivered to the "old red barn." This project involved a total of 264 days of construction time.

In the meantime, work on Phase 2 was started in August, 1958; and in July, 1959, the first material was processed. Until October, the stone produced was delivered to temporary loadout bins while the permanent facilities were being completed. Total construction time for all of phase 2 was 280 days.

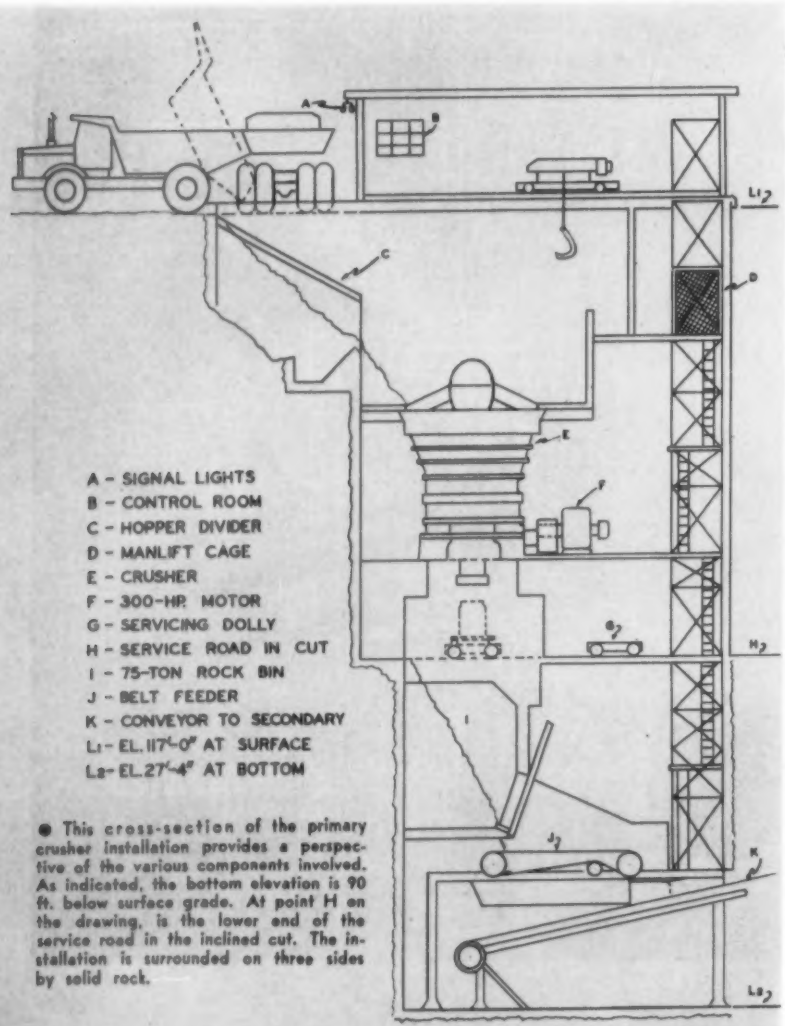
Major Equipment The summary of major equipment components is as impressive as the quantity of material required to build the plant in which they are installed. For example, the length of the complete conveyor network totals just 10 ft. less than one mile. There are eight conveyors in Phase 1, primarily Hewitt-Robins and Barber-Greene equipment, adding up to 2,290 ft. The 29 Phase 2 conveyors between surge and load-out bins total 2,980 ft. The latter are Stephens-Adamson units, and together with those of the first phase, are fitted with 11,580 ft. of Ajax belting.

Following the 54-in. Allis-Chalmers gyratory primary, there are seven crushers incorporated in the flow. Secondary reduction is handled by a 7-ft. extra-heavy-duty Nordberg Symons cone. The crushing plant in Phase 2 houses six crushers. Four are on tertiary reduction, and two handle a recrush circuit for what is actually quaternary crushing. The latter two may also be fed from the same circuit that supplies the tertiary units to augment capacity in that stage.

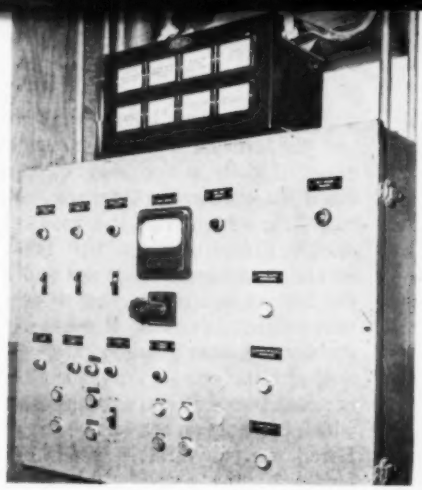
Three of the above battery of crushers are Nordberg Symons cone-type units—a 4-ft. standard cone with coarse bowl, a 5½-ft. standard with fine bowl, and a 4-ft. short head with coarse bowl. (The latter is one of the two normally used on the recrush circuit.) The other three are Allis-Chalmers equipment, including two Hydrocones (760 and 651), and a 42x16 style B double roll crusher (the other quaternary crushing unit).

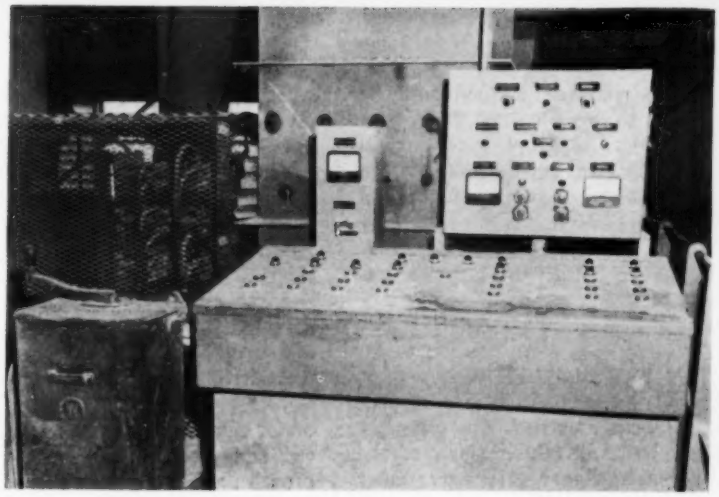
Scalping, coarse screening, fine screening, and degradation cleanup utilize 24 screens throughout the flow, ranging in size from 4- by 8-ft. to 7- by 16-ft. With the exception of four Nordberg rod deck units in the fine screening stage, Allis-Chalmers Ripl-flo screens are used throughout. Screening surfaces total more than 3,500 sq. ft. of effective screening area.

Except the crushers, equipment

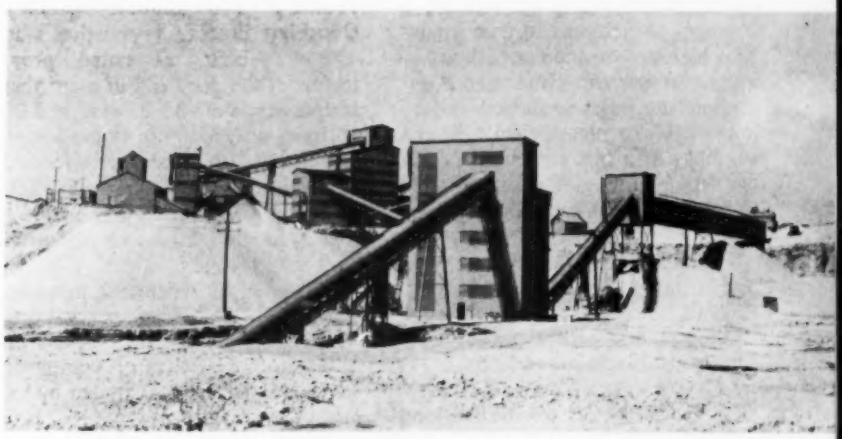

A - SIGNAL LIGHTS
B - CONTROL ROOM
C - HOPPER DIVIDER
D - MANLIFT CAGE
E - CRUSHER
F - 300-HP. MOTOR
G - SERVICING DOLLY
H - SERVICE ROAD IN CUT
I - 75-TON ROCK BIN
J - BELT FEEDER
K - CONVEYOR TO SECONDARY
L1 - EL. 117'-0" AT SURFACE
L2 - EL. 27'-4" AT BOTTOM

● This cross-section of the primary crusher installation provides a perspective of the various components involved. As indicated, the bottom elevation is 90 ft. below surface grade. At point H on the drawing, is the lower end of the service road in the inclined cut. The installation is surrounded on three sides by solid rock.





Top, left:
PRIMARY CRUSHER CONTROL is incorporated in this panel, housed above and to one side of the dump hopper.

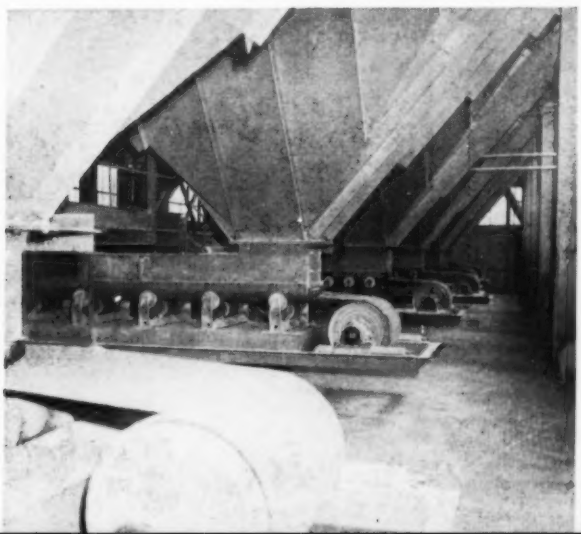


Top, right:
CONTROL PANELS IN THE SECONDARY CRUSHER BUILDING are used to regulate operation of all equipment from and including the belt feeder below the primary crusher to the conveyor carrying secondary crusher products to the surge pile tripper.

Right, middle:
SECONDARY CRUSHING is handled by a 7-ft. extra-heavy-duty cone crusher in the building at the center. The conveyor (left) rises from the 90-ft. cut. Below the surge piles (right) is a reclaiming tunnel over 300 ft. in length.

Below, right:
OVERSIZE MATERIAL from the scalpers is distributed in the bins above the battery of six tertiary crushers. In automatic shuttle operation, this tripper will respond to a low bin signal by immediately traveling to a position above that particular bin.

Below, left:
BELT FEEDERS below the tertiary crusher feed bins are automatically regulated by the motor load amperage of the crusher drives.



drive is provided predominantly by Elliott motors through Jones and Falk reducers. All plant drives total 4,460 hp. (connected), broken down to 1,440 hp. in the primary and secondary crushing stages and surge stockpiling of Phase 1, and 3,020 hp. in the tertiary crushing, screening, blending, and loadout stages of Phase 2.

PRODUCTION FLOW

Fifty years of quarrying at McCook has reached the property boundaries on three sides of the original workings. However, a few years ago, a tract was opened on the northern side of U.S. highway 66, which crosses the property, and a haulage tunnel was driven under the highway to connect the two areas. Similar and simultaneous operations are followed in both quarry areas. This involves benching in the southern area but not in the northern, where material remains to be recovered from the original opening level.

Blastholes are drilled by a pair of Joy Champions, one assigned to each of the two faces. The normal drilling pattern consists of ten holes 6¾ in. in diameter, sunk on a 19- by 17-ft. spacing. These are charged with 3,500 lb. of explosives, and the yield averages 4.2 tons of stone per lb.

At each working face a 5-cu. yd. P&H 1500 electric shovel loads the broken stone into Mack trucks fitted with 43-ton Heil rear-dump bodies. Excellently maintained and graded haulage roads are provided in both quarry areas.

Four dumping positions are provided at the primary crusher feed hopper. Normal operations utilize only the front two, alternately, although they may be used simultaneously when necessary. From a control booth, the crusher operator signals the drivers *via* sets of red and green lights when to approach the dump position and when to hold or start discharging the loads.

Primary Crushing The imposing primary crusher installation was built, as noted previously, at the deep end of a cut that is approximately 35 ft. wide and 90 ft. from surface grade to the lowest elevation. Three walls were formed by placing concrete against the surrounding rock formation, and the open side was closed with structural steel and siding.

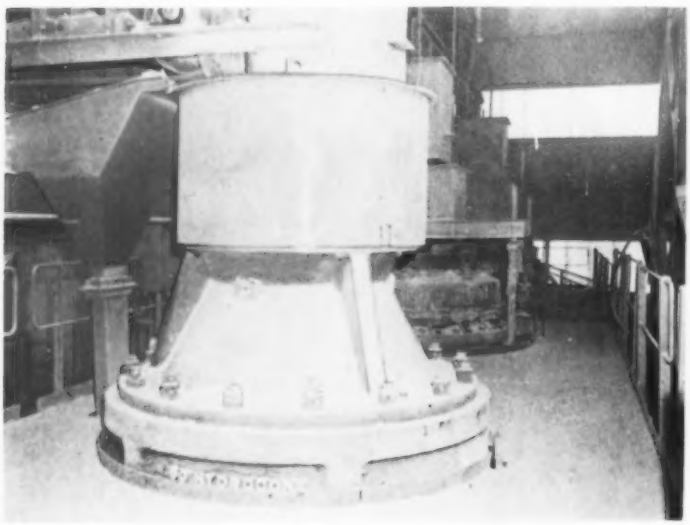
For relief of hydrostatic pressure, gravel-filled drain pockets were provided around three sides of the installation. Servicing of equipment at various levels is facilitated by the use of a manlift.

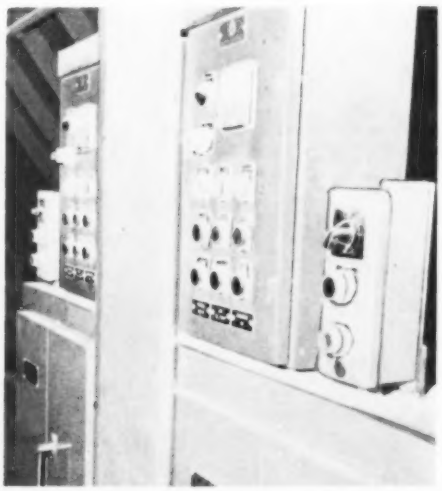
The base of the crusher and its 300-hp., 4,000-volt motor are on a level about 36 ft. below surface grade. On the floor immediately below the crusher base is a track-mounted dolly which may be run under the crusher for servicing, and out of the structure on the open cut side to a haul road at that level. Service access and work doors under the crusher are interlocked to prevent crusher operation if the doors are not in proper position.

Under the crusher servicing floor is a rock bin of 75-ton capacity from which crusher-run material is transferred on a variable-speed belt feeder to the secondary crushing plant feed conveyor. The rock bin acts as a surge and provides the desired even flow to the following stage despite any fluctuations in primary crusher discharge. It also provides for clearing the crusher if following equipment stops under other than normal conditions. The belt feeder and tail pulley of the conveyor noted above are installed on two succeeding lower levels below the service road seen in an accompanying photograph of the primary installation.

● In addition to the dumping signal light system, the controls provided for the primary crusher operator include the crusher motor, crusher oil pump, oil heater, and sump pump. Illuminated alarm signals include those for crusher oil pressure, motor overload, surge bin high level, oil flow, high oil temperature, crusher

TERTIARY REDUCTION involves five cone crushers and one double-roll. The latter and one of the cone crushers are normally engaged in what is actually quaternary reduction.





AN INDIVIDUAL CONTROL PANEL is provided for each of the tertiary crushers in addition to a master panel.

bearing fan operation, and crusher door opening.

Secondary Crushing The secondary plant feed conveyor is 508 ft. o. c., fitted with a 48-in, belt, and is operated at 400 f.p.m. Belt load is weighed continuously on a Merrick electronic conveyor scale. Drive is provided by a pair of 200-hp. G-E motors through Jones herringbone reducers. At the top of the secondary structure it discharges to a pair of 6- by 16-ft. double-deck screens that are fitted with 4-in. and 2½-in. square opening cloth on the upper and lower decks, respectively.

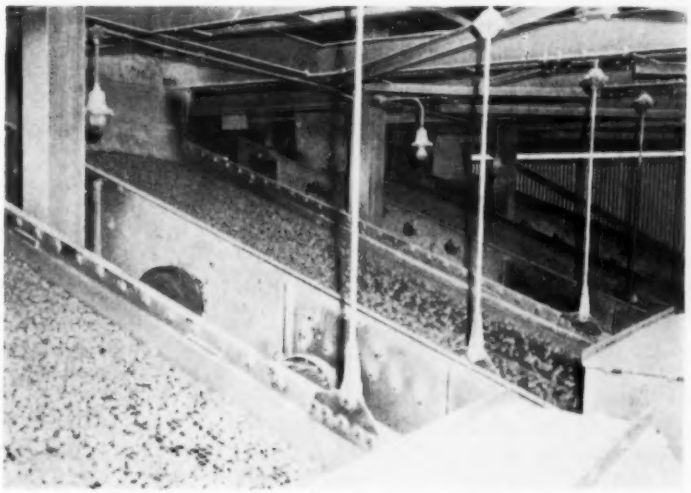
Plus 2½-in. material is chuted to the 7-ft. extra-heavy-duty secondary cone crusher. Reduction is made through a 4-in. setting, and the discharge joins the throughs from the two screens on a 42-in. by 360-ft. conveyor for transfer at 530 f.p.m. to a tripper above the surge pile.

● The control station for the secondary plant operator incorporates two drum-type controls, one for the crusher, and the other for the secondary plant feed belt. The latter control is a dual unit, geared together for its particular application in which it controls the dual conveyor drive motors. Other components controlled from this station include the belt feeder in the primary crusher house and the conveyor connecting the secondary crushing system with the surge tripper.

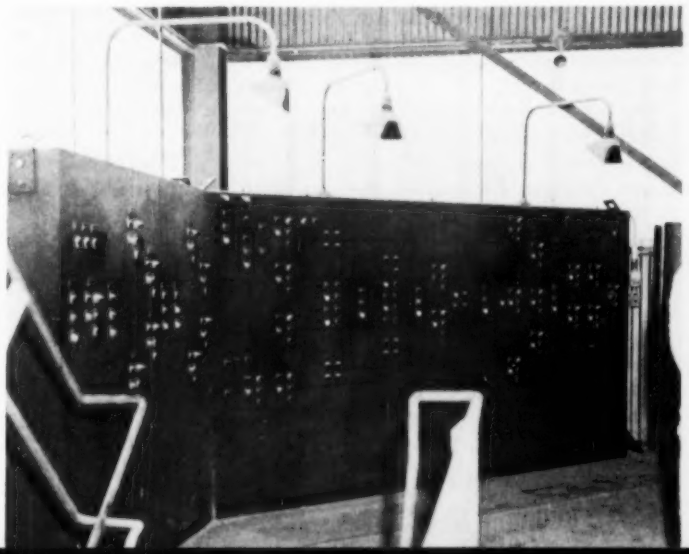
Surge Positioning of the tripper at any point along the 305-ft. length above the two surge piles (each having about 9,300-ton capacity) is handled by a ground man at a control station at ground level. However, it normally operates on automatic shuttle.

Each half of the reclaiming tunnel houses five Jeffrey feeders which are set by the ground man. Those on the drawpoints below the "flux stone" pile for the lime plant are 24- by 48-in. units that feed a 24-in.

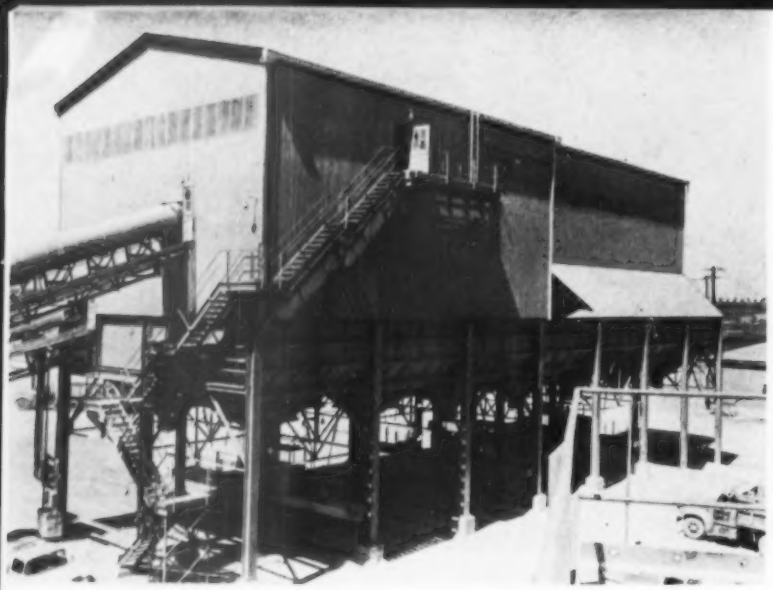
THE SCREENING PLANT is divided into a "coarse" side (right) and a "fine" side (left). Two separate and parallel screening lines are installed in each side, permitting reduced production, if desired, with no loss in efficiency. The bin area at the bottom was constructed of pres.ressed concrete planks.



THESE FOUR SCREENS are among the ten involved in the "coarse" side of the screening plant. Eight other screens are installed in the "fine" side.



WITH THIS PANEL, the screening plant operator regulates the flow of material through all screening circuits via motorized flopgates, internal conveyor systems, etc.



Top:
THE 14 LOADOUT BINS seen here are supplied by a versatile distributing system of turnheads and conveyors in the upper part of the structure. Trucks may be loaded in any of the drive-throughs. The two at the far right are also used for rail loading.

Below:
THE MAIN TURNHEAD above the loadout bins is a six-position unit which can discharge directly, as seen here, into one of four bins, or can feed either of two conveyors leading to another pair of turnheads.

conveyor supplying that installation. Those below the aggregate plant surge are 36- by 48-in. 250-t.p.h. feeders, and the reclaiming conveyor is a 42-in. wide unit. An R.C.A. metal detector above this belt protects subsequent processing from tramp iron.

The latter conveyor discharges to a 42-in. belt, 462 ft. o.c., on which the plant feed is carried out of the quarry and up to the scalping tower. At this point the material is split to a battery of three 6- by 16-ft. triple-deck scalping screens.

Material retained on the top decks of these screens is chuted to a 42-in. belt for transport to the crushing plant. The middle-deck fraction may join that from the top deck or be chuted to a separate conveyor system for transfer to the screening plant. This is true of the bottom-deck retained material also, although normally the latter joins the bottom deck throughs, and is conveyed to a stationary stacker at the quarry rim, from which they are discharged onto a pile of 1 x 0 flexible base material.

Tertiary Crushing Feed delivered to the crushing plant is received on a 42-in. wide tripper conveyor that operates along a line above a set of six 150-ton crusher feed bins. This tripper may be positioned manually, or put on automatic shuttle. In the latter operation, it will go automatically to a particular bin on a low bin level signal.

Crusher feed is delivered to 30-in. belt feeders under each bin. Feeder speeds are automatically regulated by motor load amperage.

In addition to the main panel which houses controls for all six tertiary (and quaternary) crushers, individual panels are installed above each crushing unit. Currently, the 4-ft. and 5½-ft. standard cone crushers are set for ⅞ and ⅝ in., respectively. The 760 and 651 Hydrocones have ½- and ⅜-in. settings. Quaternary reduction in the 4-ft. short head and 42x16 double roll is to minus ⅜-in.

Discharge from all crushers is received on an underlying 42-in. belt. This, in turn, discharges to a following 42-in. conveyor on which crusher products are carried to a transfer tower. At this point the material may be delivered to a cleanup screen for removal of fines and then sent directly to the loadout bins, or, in more routine operation, it can be discharged onto the conveyor supplying the screening plant.

● The tertiary crusher control station covers several flow stages. These include the surge reclaim conveyor and the following conveyor feeding the main plant, the scalping stage, the tertiary crushing plant feed belt and tripper conveyor, the tertiary crushers, the collecting belt under the crushing plant, and the conveying systems feeding the screening plant.

Finish Screening From the discharge of the feed conveyor, the material may enter two parallel flow lines. These are identical, each being comprised of five "coarse" screening units, and four following screens of "fine" sizing. Each line consist of a top 6- by 16-ft. double-deck screen followed by a 5- by 14-ft. triple-deck unit,

two 6- by 16-ft. double-deck screens, and a 5- by 12-ft. unit. The first two separate the larger fractions, *i.e.*, plus 1½ in.; and the latter three screens handle a minus 1½-in. feed. Both lines produce the same fractions, and either may be shut down while the other is in operation.

The largest retained fraction from the coarse screens, plus 3-in., is chuted to a surge bin, from which it is returned to the crushing plant tripper conveyor. Each of the other fractions from the coarse side, excepting ½ x 0 material, is placed in the appropriate one of the underlying 600-ton bins. The latter, as indicated earlier, were constructed of 7-in. thick prestressed concrete planks.

An optional system provides for returning all or a part of the 2½ x 1½ and 1½ x 1 fractions to the quaternary crusher feed bins. Motorized flopgates in this system permit the operator sufficient time to return these materials to the crushing plant upon receiving a full bin signal, and to correct for an unbalanced flow without shutting down the plant.

From each coarse screening circuit the throughs are carried on a 24-in. belt to the respective fine-screening line. Each of the latter incorporates two 6- by 16-ft. double-deck, and two rod deck screens. All top decks are fitted with drag chains, attached to a common oscillating arm, to prevent blinding. In addition, gas burners are inserted into the hoppers below all screens—four burners for each of the larger units, and one for each of the smaller ones.

The four products of fine screening, ranging from ½ x ⅜ to #8 x 0, are chuted into the respective bins. (The #8 x 0 material is stored in a steel bin adjoining the screening building, and may be loaded directly into trucks or rail cars.)

In the normal recrush circuit, any material from the coarse screen bins, and the plus 3-in. fraction, are chuted onto a conveyor on the side of the screening plant, and are transferred to the belt feeding the tripper in the crushing plant.

● An accompanying photograph illustrates the control console for the various screening circuits, motorized flopgates, and conveying systems in the screening plant. These panels are housed on the "coarse" side of the plant. They also incorporate the controls for regulating the recrush circuit conveyors.

ONLY ONE MAN IS NEEDED to handle the entire flow from the screening plant product bins to and including the turnheads above the loadout bins. The panel seen here incorporates controls for the various equipment components. On the opening page of this article is a view of the double bank of rheostats with which this operator can set the feeders below the screening plant bins. Details of the efficient blending and product-handling system are presented in the text.

Loadout Operations Each of the eight draw points in a tunnel below the screening plant bins is fitted with a 48- by 60-in., 500 t.p.h. Jeffrey vibrating feeder. These discharge onto a 42-in. conveyor leading to the transfer tower. Here the individual sizes, or blends, may be passed over the cleanup screen, or by-pass that unit and be placed directly on a 42-in. belt entering the loadout bin structure.

As described below, the feeders below the screening plant bins and the collecting belt are regulated by the loadout bin operator.

Flexibility and control over blending to virtually any specification is probably the most outstanding among the several efficient features of this impressive operation. To add frosting to the cake, only one man is needed to handle the entire procedure between screening plant-sized product bins and loadout bins.

● In his control station at the top of the loadout bin structure is a console from which he controls and positions the supplying and internal conveying systems, plus turnheads at certain conveyor discharge points. In addition, a double bank of rheostats is installed, with which the feeders below the screening plant bins are controlled.

Calibrated feeder settings for any desired blend are set on one bank of rheostats, and the system is energized to deliver that product to the appropriate loadout bin. While this flow is in process, another blend may be set up on the other bank of rheostats. When the first flow is terminated, the second will automatically cut in—following a blank space left on the belt by automatic timed-relay control.

As shown in an accompanying

(*Concluded on page* 149)

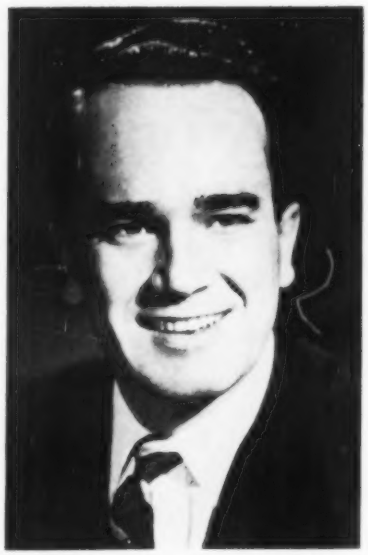
SUPERVISION. Overall direction of the new McCook plant, and other division facilities, is the responsibility of Clay Lambert, left, vice-president, operations. At the right is his assistant, R. W. McCall.

Market for Insulated Masonry Walls Stressed at Vermiculite Meeting

THE large potential market for insulated masonry walls received considerable attention at the 19th annual meeting of the Vermiculite Institute of Chicago, held March 19 through 24 at Chandler, Ariz.

L. J. Lambert, chairman of the insulation committee, pointed out that in 1959 only about 10 percent of the 1,200,000 homes built in the nation were of block construction. In commercial and industrial buildings, lumber and other materials took the major share also. Mr. Lambert declared that the block industry can get the business it is entitled to by actively promoting masonry walls insulated with the new water-repellent vermiculite fill. Such walls provide a building enclosure that is thermally efficient, fast to erect, and low in cost. It is fireproof, time-tested, and permanent, he pointed out.

For the home builder, this "all in one" wall construction means savings that he can pass along to the buyer. An eastern contractor is currently offering two-bedroom homes with 768 sq. ft. of floorspace for $7,500, including a 37 by 75-ft. lot. The construction is concrete slab with interior and exterior walls of lightweight block. The entire wall



L. G. McDiarmaid, president of Vermiculite Institute of Chicago.

area of a house was insulated with water-repellent vermiculite in less than six hours by one man, who poured directly from the bag into the top course of masonry. The "U" factor of these walls, with no interior finish, is reported to be 0.18.

Mr. Lambert also reviewed recent tests made at Pennsylvania State University of 6-, 8-, and 12-in. concrete block walls, with the cores filled with water-repellent vermiculite. While insulation in the cores increases the inside surface temperature of the entire wall, the tests show conclusively that no cold spots occur opposite the webs of the block, a fact that is of greater importance, Mr. Lambert stated. This is a positive answer to the comment often made by architects and designers that even if the cores are insulated, there will be cold spots on the walls opposite the solid portions.

C. R. Babb, chairman of the concrete committee, announced that the Army Corps of Engineers at Washington, D. C., has just published a definitive new specification for cast-in-place vermiculite concrete over various formboards. This makes it possible to bid virtually any type of deck, using vermiculite in combination with other materials, on Corps of Engineers' specifications.

He also distributed three new publications. One is a data sheet and short form specification for a vermiculite roof system, recently fire-rated at 2 hours, which combines insulation, sound control, and fire protection in one economical assembly. It is the only 2-hour roof deck with exposed supporting members

(*Continued on page 134*)

These delegates attended the 19th annual meeting of the Vermiculite Institute of Chicago, held recently at Chandler, Ariz.

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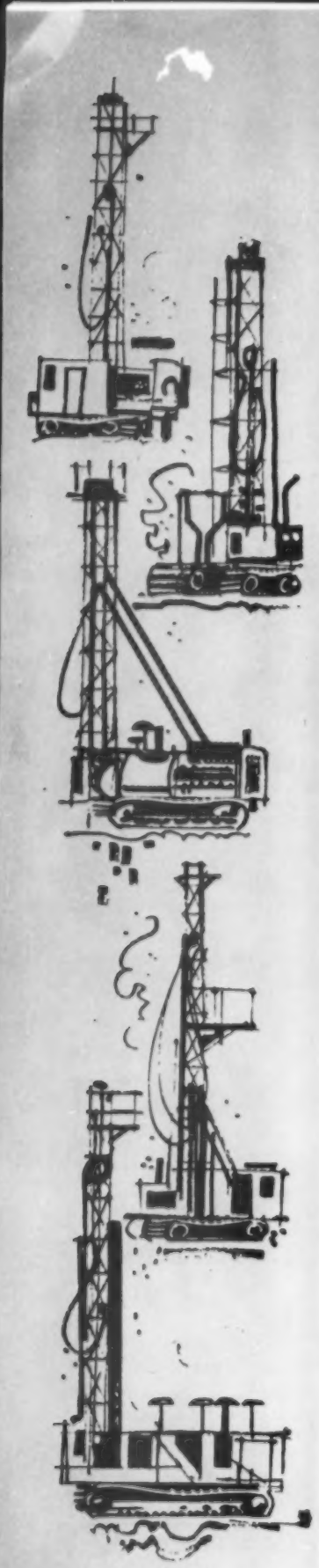

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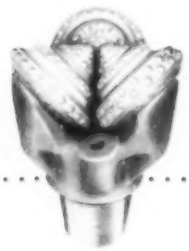
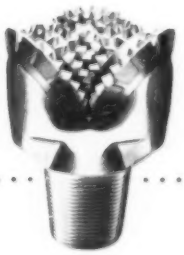
Hughes "ROTA-BLAST" RG-2JS Mining Bit – Instead of conventional teeth, this bit has sintered tungsten carbide inserts combined in a special process with alloy steel cones. They provide maximum resistance to wear in the hardest and most abrasive formations. Inserts in the gage surfaces of the cones reduce gage wear and increase the cutting efficiency of the bit. Inserts on the bit legs eliminate the problem of body wear.

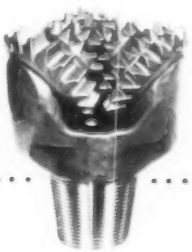
Hughes "ROTA-BLAST" bits – Engineered for Mining



RG-2JS
For extremely hard abrasive rock (Taconite, quartzite)



W7R
For hard rock (Siliceous limestone, dolomite, sandstone, granite)



OW
For medium rock (Limestone, sandstone, sandy shales)

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In the extremely hard, abrasive taconite in the Mesabi Iron Range, steel tooth bits drilled from 5 to 20 feet. The RG-2JS "ROTA-BLAST" consistently makes 500 to 800 feet of hole per bit in the same type of rock.

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For soft formations
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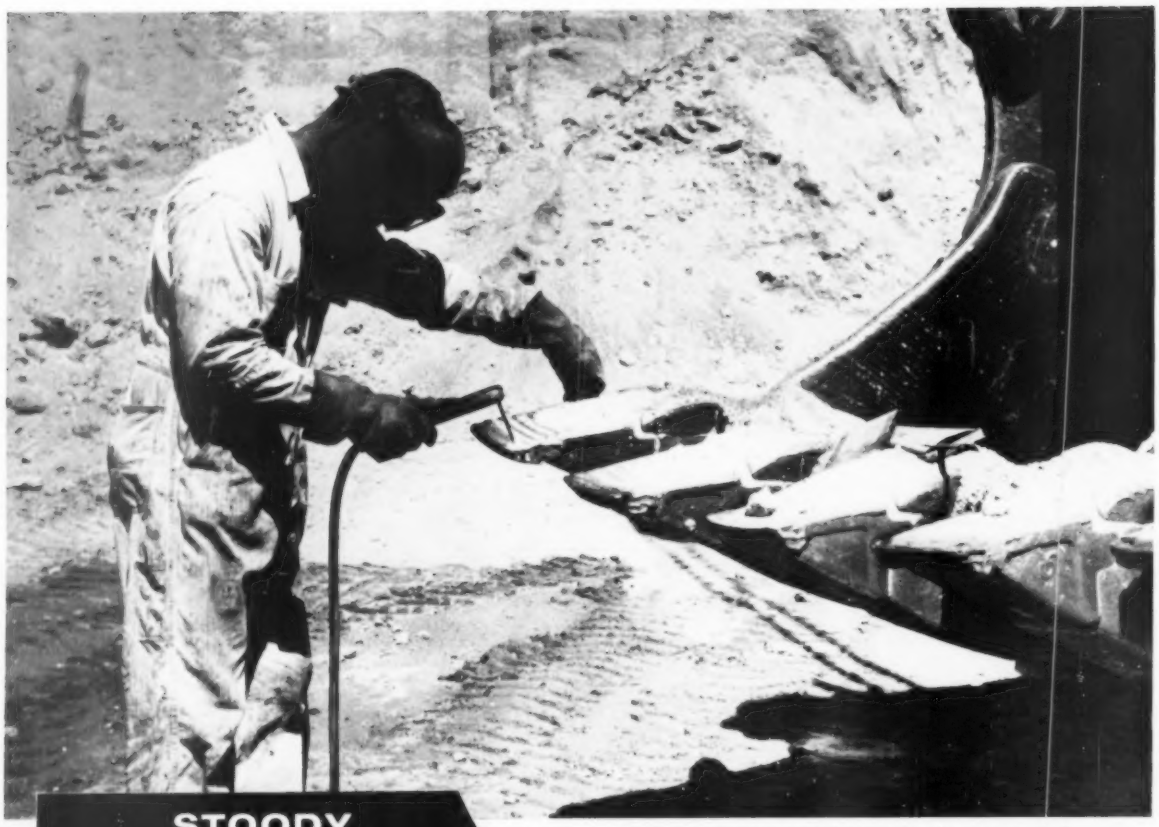

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the Coming Role of Pozzolans

Part VI. Heat-Activation Techniques

WOLF G. BAUER
Consulting Engineer

AS we have repeatedly pointed out, it would be difficult, indeed, to find another group of raw materials classified under one name which will include and exhibit the wide variations found in the chemical, physical, and mineralogical properties of the lime-reactive rocks, minerals, and glasses we call pozzolans. Thus it is not unreasonable to expect some heat-activating techniques and pyro-processing equipment to be more suitable for the purpose than others, with each raw material.

Process Requirements Before establishing satisfactory equipment and techniques, we might first assess the basic heating conditions required by various materials. The reader is referred to the November, 1954, issue of PIT & QUARRY (pp. 83-86), in which we examined the mechanics of thermal activation as they related to the various mineralogical groups and classes of pozzolans. In that discussion, it was shown that optimum pozzolanic reactivity to alkalies and for certain chemical buffering purposes is achieved in some cases with temperatures and exposure times different from those required for highest strength. The heat-activating process may, therefore, have to be designed to operate at more than one temperature level, depending on product requirements.

Intimately related to process temperature level is the optimum process time factor, or the temperature profile to be maintained. Process time commences and goes into effect at the point where the first chemical reaction takes place, usually the dissociation of the water of constitution in the form of OH and H ions from 900 deg. F. and higher. While in some processes the optimum temperature is reached quickly and is then held for some time, in others the heating and dehydration period is slow, and only a short holding period at activating temperature is required. Such chemical dehydration may proceed with partial or complete destruction of the original atomic network, or there may be no rearrangement of the crystal lattice.

Aside from maintaining an optimum time-temperature processing history, atmospheric conditions, *i.e.*, heating gas composition, may also influence heat activation. The writer has found that many pozzolanic raw materials are sensitive to this influence, and that the reactivity of most is aided by neutral to oxidizing gas atmospheres. This is a helpful state of affairs, since it is relatively easy to maintain clean combustion and higher burning efficiency with excess air at the relatively low process temperatures generally called for.

Oxidizing atmospheres at low temperatures, however, are not conducive to economic fuel utilization, since the fully developed flame radiation heat transfer cannot always be applied directly to the material, and may have to be generated in an outside high-efficiency furnace or shielded ignition muffle.*

Material Preparation and Choice of Equipment The choice of heat-activating equipment for the pozzolan manufacturer is limited to the physical nature of the raw material, as well as to the length of reaction time to which the material must be exposed. Economics of fuel efficiency and output per investment also play major roles, although ideal processing conditions often run counter to the economic considerations. Obtaining high output from a calcining unit requires high heat transfer rates into deeper beds or layers of material. Using excess temperature to drive heat into such heavier material streams will result in a product made up of an average of over-, normally-, or under-heated particles, with the operator compromising between economics and highest quality.

Probably more than any other consideration upon which the choice of calcining equipment hinges are particle size and range, as well as hardness or stickiness. It is not so much the character of the material *in situ* at the deposit, as our ability to prepare a maximum proportion of the deposit or supply into suitably sized particles, that affects the decision on the calcining equipment to be used.

Uppermost in this choice is the matter of raw material conservation and economics. We might even make a generalized observation to the effect that the narrower the particle size range, and the greater the ability of each particle to retain its original physical identity throughout the heating process, the more efficient will be the operation, from the process as well as the overall economic standpoint.

Process design research will determine what can be accomplished in the way of producing suitable

*Bauer, Wolf G.—*How to Control Heat for Calciners, Chemical Engineering*, May 5, 1954; *Modern Design Principles in Pyro-Processing*, Parts I, II, III, PIT & QUARRY, May-June-September, 1952.

feed material. With equipment feasibility thus narrowed down, final choice then rests with the economic balance of material conservation and production costs.

TYPES OF RAW MATERIALS

To simplify the discussion, let us divide raw materials into three general groups, according to their physical characteristics as they affect sizing and size maintenance during the process, namely: (1) hard, nonplastic; (2) soft, slightly cohesive; (3) soft, plastic.

Hard Material, Non-Plastic Such raw material may be derived from trachites, volcanic cinders, slags, silt-stones, slates, cherts, and certain shales. Careful closed-circuit screen-crushing will yield any number of narrow-size fractions down to pea-size particles. Material below this size may be wasted if it constitutes only a small fraction. If full utilization is required, the sand and powder fraction may be briquetted to particles of the same size as the graded material and added thereto. If briquetting with or without binder does not produce strong enough particles, the sand-powder portion may be heat-treated in a separate calciner suited for such material.

Soft Material, Slightly Cohesive In this group may be found most shales, silty clays, pumices, diatomites, weathered rock mixtures, and compacted volcanic ash. In some instances, it is possible to prepare these into suitably sized feed fractions. Often, however, the sand to powder sizes will make up a substantial portion, amounting in some cases to more than half of the material mined.

While it may be possible to crush and screen initially clean and narrow-sized feed particles for calcining in direct-contact or rotary kilns, the friction, weight, or rolling action could easily break down these sizes into more fines and dust which are detrimental to the process and heat transfer, as well as to output efficiency.

If this is the case, it may well be best to reduce all material to sand size or finer and then re-constitute these fines to one particle size for proper feed. This can be done by briquetting as already mentioned, or by pan or drum pelletizing.

Usually the materials in this division can stand considerable thermal shock and fast drying rates because of their open pore structure and low shrinkage. However, if pellets are too weak, or if they abrade too easily, special calciners designed for low dust pick-up must be used. It is also possible to use a flash-activating technique on the finest particles, with a combination of fluidized bed and integral cyclone circulating stream, in order to gain exposure time during particle suspension in the heating gases.

Soft Material, Plastic Many of the various types of clays, bentonites, muds, and soft shales fall into this division. They generally hold considerable moisture within their fine pores, a characteristic which requires feed conditioning from the sticky or plastic state.

Two methods may be considered in preparing such materials for heat treatment. The simpler method makes use of the fact that some of these materials will decrepitate or steam-spall upon rapid heating during the drying period, thus creating smaller particles from the original plastic lump size.

The second method of feed preparation is by means of plastic extrusion into small formlings. These particles are then either dried and hardened with waste heat before being fed to the calciner; or, in the case of a rotary kiln, they can be handled directly as in the foregoing method.

By designing the kiln for hot metal contact with the sticky material directly introduced onto the bare kiln shell or flexible chain system, and by providing surface coatings of hot recycle-dust, agglomeration and lumping can be inhibited to a large extent.

HEAT-ACTIVATING CALCINERS

Rabble furnaces, fluid-bed calciners, flash roasters, continuous muffle kilns, and special rotary kilns may be used for heat-treating pozzolanic raw materials of a wide size range. If fines of such materials can be compacted into dense hard pellets or briquettes, shaft kilns of several types, as well as downdraft grate sinter-type machines of special gas-flow arrangement, can be used. The latter are also suitable for crushed-screened coarser fractions.

The illustrations in Figures 1, 2, and 3 show schematically the salient features of several such calciners. A brief discussion of their adaptability may be given.

Rabble The circular multiple-hearth furnace could, with some modifications from its more usual roasting use, be adapted to heat activation, particularly if activating time is relatively drawn out and material is of small size and wide range. Control would be quite good, velocities of heating gas could be held low, and dusting moderate. There are some temperature limitations and a relatively high first cost for high temperature operation. Power is moderate; thermal efficiency would be only fair; best size range is ½-in. to sand size.

Shaft Several types of vertical shaft kilns can be adapted to this use with the harder and closely-sized coarse feed particles. Dusting would be low, control fair, power moderate, operation simple and low-cost, thermal efficiency high, temperature range wide, material conservation poor, first cost low. These kilns are not readily adaptable to more than one or two size ranges. What holds true here for the counterflow vertical kiln would also apply to the shaft-type cross-flow designs, although control may be somewhat more precise in the latter. Best size range is 3 : 1 ratio from 6 in. to ½ in.

Fluid Bed This processing technique is particularly suited to fine material that cannot easily be compacted for use in other types of units. Dusting is usually heavy, with sizes below 30 microns, although integral hot-gas cyclonic recycling will materially decrease dust losses. Power is relatively high, but thermal efficiency is good. Control is better than average, especially if short activating time is indicated within narrow temperature range. Maintenance is low, first cost mod-

erate, material conservation moderately good. Best size of feed particles is between 20-mesh to 100-mesh, although the writer has used coarser particles.

Rotary The rotary kiln is, no doubt, the most widely used and best known calcining unit for the job. This kiln is at a disadvantage for low-temperature work; its thermal efficiency is then even lower than when operating in its more normal range above 2,000 deg. F. However, its ability to handle a wide range of feed sizes, intermediate dusting tendency, high capacity with moderate power, good control within certain limits, and the fact that it can handle wet and sticky materials if designed for the purpose make it still one of the most nearly foolproof machines devised for heat-treating the widest range of materials at 1,500 deg. F. and up. Best size range is 3 : 1 from 4 in. down to ¼ in., although sand size without dust can be handled in some cases.

Moving Grate This pyro-processing machine is generally associated with sintering operations, in which the material, mixed with low-volatile fuel, is heated to the partial fusion state above the temperature of pozzolan activation. Thus the normal sintering machine is not suitable for heat activation without special adaption and redesign for the purpose. The schematic illustration in Figure 3 shows the necessary arrangement.

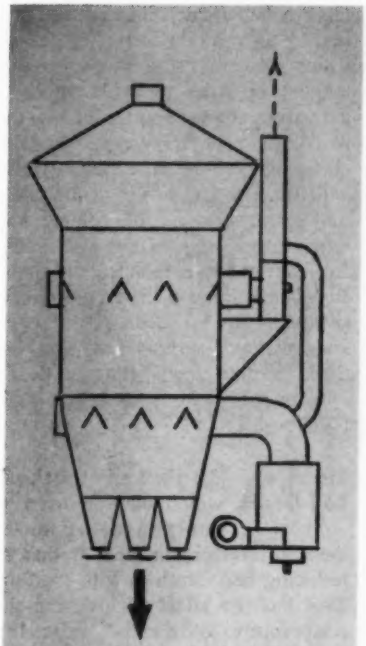

Fig. 1—Specialized shaft kiln (crushed, sized material).

Output and control should be good, maintenance and first cost intermediate, power and dusting high because of the high bed resistance and gas velocities required, and thermal efficiency with external heat source would be lower than in normal sintering operation. The total energy requirement (heat + power) would be higher than some of the other kilns discussed here. An advantage would be the ability to handle somewhat friable materials. Best particle size is in the ⅜- to ½-in. range, or slightly larger than for sintering. Particularly is it adaptable to pelletized fines of narrow size range.

FACTORS AFFECTING TIME-TEMPERATURE PROFILE IN ROTARY ACTIVATING KILNS

In view of the adaptability of the rotary kiln to the heat treatment of many of the pozzolanic raw materials, a discussion of some of the problems involved in this relatively new low-temperature process as it pertains to this type of kiln should be of particular interest. There are direct relationships, such as kiln speed being inversely proportional to material travel or heat exposure time.

There are also somewhat indirect relationships between kiln loading or material bed depth and average-particle drying or heating rate. While we can cut kiln speed in half, for instance, in order to double ma-

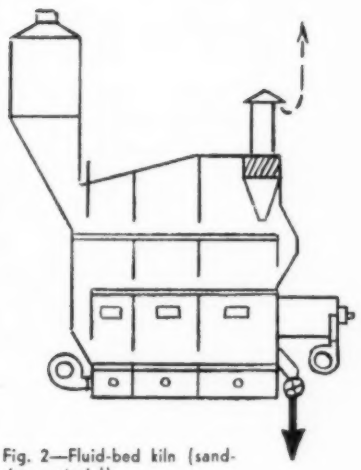

Fig. 2—Fluid-bed kiln (sand-size material).

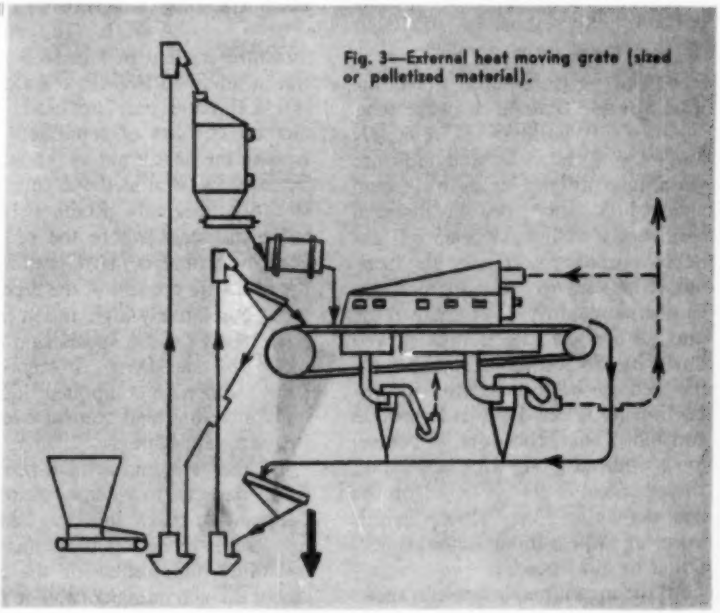

Fig. 3—External heat moving grate (sized or pelletized material).

terial processing time, we cannot necessarily lower feed to 50 percent to cut processing time in two, although lesser kiln loading will increase the average-particle drying and heating rate.

In a single-heat-source rotary kiln, the drying and preheating heat is derived from the excess heat escaping the activating zone. Since this heat is adjusted to the all-important activating process, it does not necessarily follow that this processing heat is the optimum for meeting variations in drying and preheating requirements.

We might follow through on an example in which, for instance, moisture in a clay or shale feed begins to increase, and discuss the necessary corrections and their effects on the maintenance of a constant activating time-temperature condition. We know, for example, that as the higher moisture material enters the kiln, the starting point of the preheating zone is pushed farther down the kiln towards the activating zone. While this will tend somewhat to shorten the preheating zone, it will also tend to move the starting point of the activating zone downstream, thus shortening the activating or process time.

These are basic variations in cause and effect which can be met by several techniques of kiln operation. Three approaches may be looked into here, each depending somewhat on the process requirements and range of fluctuations to be expected.

Effect of Kiln Speed If required activating time at process temperature is relatively long, say 30 minutes, and moisture variations are not excessive, small changes in kiln speed or material residence time in each zone will not affect pozzolan reactivity too seriously, and an increase in moisture can be handled by slowing down the kiln. When the kiln is thus slowed down to provide more drying time, the feed must also be decreased proportionally if bed depth is to remain constant. This procedure, of course, lowers output along with heat input, since control is always based on the heat-activating zone. However, this lowering of heat input is not proportional to kiln speed.

In the meantime, lower kiln speed has also lengthened the material residence time in the activating zone, which now must be shortened (in length) in order to avoid affecting activating time. Shortening of the activating zone is accomplished by changing length, direction, width, velocity, and luminosity of the flame and its pattern, or the volume and temperature of the hot gas stream from an external furnace. If moisture fluctuations in the feed are relatively large, however, kiln speed changes and output may also become rather high, thus critically affecting process and economic efficiencies.

Effect of Bed Depth A second method, which can be used in compensating for increased moisture in feed, is that of reducing bed depth or kiln loading. This has the effect of lowering the temperature differential (driving force) required between bed and gas, since heat penetration and surface particle heat-shielding is thereby lessened. Cutting down on feed without proportionally reducing kiln speed will tend to maintain the relative length of each of the process zones, as well as the time. While this method has merit from the processing standpoint, it is evident that both fuel and overall efficiency are lowered with the decrease in kiln output.

Effect of Zone Heating In order to retain maximum output with fluctuating moisture content in kiln feed material, a modified two-stage zone control technique may be used. This method consists of separately controlling the heat input to the activating zone, as well as the drying zone. It can be partially accomplished in those instances where the required activating time is short, and where the moisture content of the feed material is relatively high and variable. It is based on the specialized technique of designing a compound flame, with each component individually affecting heat control over the two separate zones.

In this system, a high-position, long, and narrow-flame burner is designed to reach into the heating-up middle zone of the kiln, with minimum direct effect on the material in the activating zone. The flame and hot gas stream from this burner are made to flow along the ceiling of the activating zone in the kiln before spreading out to scrub the material bed surface farthur up the kiln.

A second burner, called the process-burner, is designed to produce a different type of flame or hot gas pattern; and it affects and contacts directly the lower heat-activating zone near the discharge end. With such dual zone control it is possible to compensate, to a considerable extent, the effects of changes in kiln speed, bed depth, and feed characteristics as they affect both process and economic operating conditions.

DESIGN AND NEED FOR KILN CONTROL FLEXIBILITY

Since activating control is so important in this phase of pozzolan processing, and since kiln control conditions are so different from those normally encountered in the usual higher temperature operations of rotary kilns, it may be of interest now to point to some of the specific control problems and their solutions.

Drying-Heat Control This initial stage of heat application to the material is handled by the drying-control burner or hot gas stream, which delivers most of its heat to the preheating and drying zone ahead of the activating or process zone. As in standard drying practice, this heat is regulated automatically from a pyrometer controller, which reacts to exhaust gas temperature changes sensed by a strategically located thermocouple at the kiln feed end. This controller actuates the fuel or hot gas flow valve.

Reactions to temperature changes due to moisture and/or feed volume are rapid; there is practically no time lag. Automatic control is, therefore, readily carried out and effective in its leveling operation. Small changes are quickly sensed and corrected. It should be pointed out that not all drying heat can be made to by-pass the activating zone entirely, nor is this desirable. The amount which leaks off to the material in the activating zone, while on its way to the pre-heat and drying zones, is somewhat dependent on the length of that zone, as well as on the fuel type, burner design, manner of introducing heating gas from an

external furnace, degree of kiln loading, and temperature profile to be maintained.

Drying control, separated from activating control, operates best when fluctuations introduced by feed moisture changes are small. However, it is especially effective when the moisture level of the material is high, and the activating time is short.

Activating-Heat Control The time-temperature profile required in the activating zone is maintained by the second or process burner or gas supply means. If flame generation is within the kiln proper, the burner design is distinguished by its ability to transfer most of its heat over the length of the material bed in this zone at a uniform rate. In order to be effective as an independent heat source for this zone, it must itself constitute only a small fraction of the total heat supply. This is true when moisture is high. In such cases, the heat required to drive off the moisture and preheat the dried material to the processing temperature is by far the greatest proportion of that introduced into the kiln, since the activating heat is only a material-soaking heat, plus excess to take care of radiation losses.

Automatic regulation of material (average-particle) temperature in this zone is more difficult than such control exercised in the drying zone. The difficulty is in the inherent time lag between sensing material temperature and completing a correction cycle. This problem can be overcome, however, through the provision of an adjustable repeat-cycle timer. For pozzolans in the 10- to 20-minute activating time range (the short period range for rotary-kiln-sized particles) this lag may not amount to more than 5 minutes or so. It depends on the location of the sensing point with respect to its distance from the impact point of the hot gas or radiation under control.

The sensing device may be a low-temperature range, narrow-field radiation thermopile for the higher activating temperatures of 1,600 to 1,800 deg. F. Or it may be a shielded thermocouple for temperatures below 1,500 deg. F., located within the bed of discharging material. The successful application of either of these two sensing devices is an art based on much trial and error, and depends on carefully established operating factors in conjunction with the burner or hot gas jet designs.

Speed—Feed Ratio Control The drying and activating heat input control techniques outlined previously must be further augmented by an accurate regulation of both material bed depth and process retention time as feed moisture and other variations occur. Since there is no direct straight-line relationship between heat input rate and heat absorption by the material, it is impossible to correct for feed or process variations by fuel input and draft control alone. Under certain conditions, it may be necessary to carry a shallow material bed, in order to maintain the drying, preheating, or activating zone lengths within the necessary limits for completion of the process in each without zone shifting.

If, for example, drying time must be increased by slowing down the kiln, this would also lengthen activating time, unless heat-input effect in the activating zone is also lessened. If it is, the kiln may be slowed down without affecting the process. Whether feed is then held constant, lowered proportionally, or lowered to some new kiln loading ratio depends on the individual case. The important point is that bed depth, as well as kiln residence time, can be varied accurately and independently, as needed.

In order to exercise such ratio control, kiln and feeder must be on variable-speed drives, which can be trimmed to exact proportional ratios from tachometers on the control board. Depending on the type and sizing of raw material fed, such a kiln feeder may be either a weight or volume type in which speed, rather than discharge opening, regulates material flow. Small a.c. or d.c. generators, driven off the kiln and feeder variable-high-speed shafts, actuate the tachometers, which are calibrated in percentage of full speed for proportioning or trimming, with reversing switches to the small reversing control motors on each variable-speed transmission. (See Figure 4.)

(*Continued on page* 134)

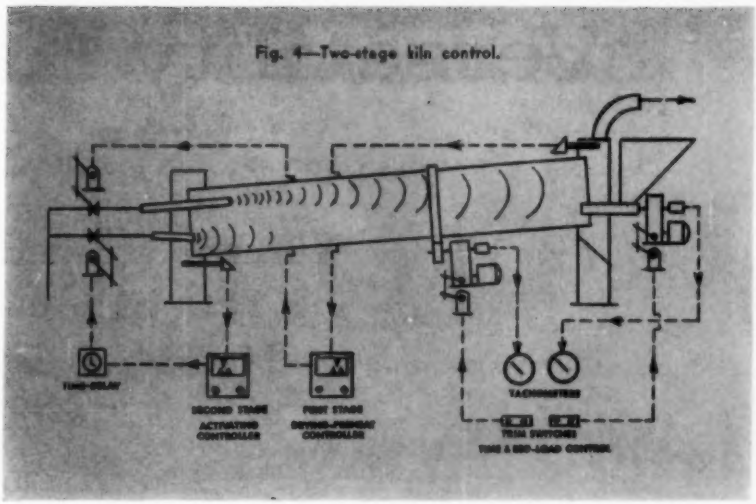

Fig. 4—Two-stage kiln control.

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• Correction

Due to a typographical error, a passage in Part V of Mr. Bauer's series of articles on *The Coming Role of Pozzolans* was incorrect. The sentence in question (see PIT AND QUARRY, April, 1960, page 136) should have read as follows: "Unlike Circuit II, it is not absolutely necessary to use weigh-control primary feeders in this circuit." The word *not* was inadvertently omitted from the text.

Versatility Keynote in

■ Aussie crushed stone plant delivering 280 t.p.h. in wide product range for Melbourne markets

By E. D. YOUNG
Director
Jaques Bros. Limited
Melbourne, Australia

AT THE small town of Tullamarine, 12 miles from Melbourne, Victoria, Australia, is a stone crushing plant operated by Bayview Limited of Melbourne, which is described as probably the most modern and flexible installation of its type in Australia.

Company History The Bayview Quarries Group originated as a proprietary company in January, 1948, when a quarry at Narre Warren, situated about 26 miles from Melbourne, was acquired. Since then a number of other sites for stone quarries and sand pits have been secured.

All of the Bayview Group's quarries and sand pits are strategically located in outer metropolitan areas and nearby centers, thus placing it on a favorably competitive basis with other quarries and pits by virtue of the relative cartage costs.

Since its inception 12 years ago, the Bayview Group has steadily increased its production and clientele. The latter includes a number of government, semi-governmental, and local authorities, as well as many users in the building industry.

Over the years substantial sums have been spent in modernizing older working units and in bringing new quarries and sand pits into production by the installation of modern equipment.

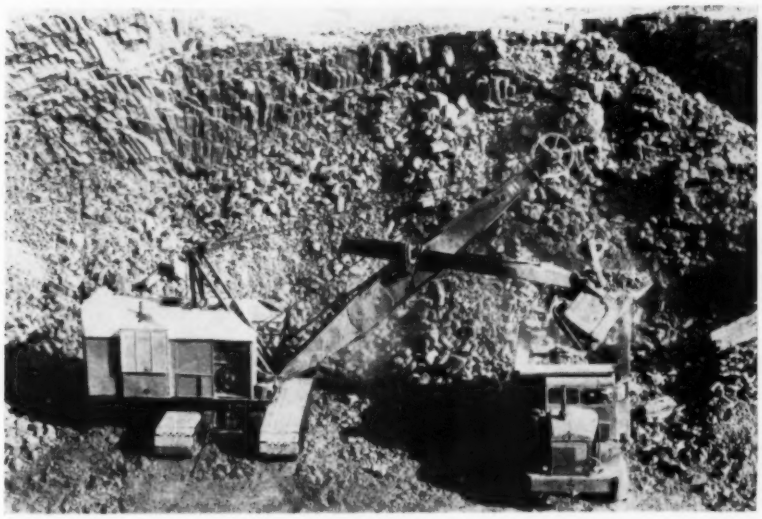
In 1959 the company became a public company in which the general public was able to invest, and the company's shares are now quoted on the Melbourne Stock Exchange; the name of the firm then became "Bayview Limited."

Tullamarine Development Several years ago it was decided that, to further increase production, a modern stone-crushing plant should be installed at the Tullamarine site. In order to meet competitive market requirements, it was considered of paramount importance that the plant should not only be completely flexible in respect to the proportioning of production of various sizes of materials, but that the final products should be top-quality material of cubical shape and accurately screened to specified sizes.

In close co-operation with Bayview Limited, the plant was designed, manufactured, and supplied by Jaques Bros. Limited of Melbourne. The plant embodies features that the operators of Bayview Limited, following their 12 years of operation in other quarries, where identical stone is being processed,

SHOWN HERE IS THE GRADED RUBBLE CIRCUIT. At the left is the rubble pile, at the right center (below the screen) is the fines bin, and at the far right, the primary crusher installation.

Down-Under Operation



Right:
THIS QUARRY VIEW effectively shows the columnar jointing of the basalt formation. One of the two 3½-cu. yd. shovels is seen loading a 22-ton quarry truck.

A GENERAL VIEW of the 280-t.p.h. Bayview Ltd. quarry at Tullamarine, near Melbourne, Australia. In the foreground is the primary crushing installation, and at the right, the surge pile.

TERTIARY REDUCTION. At the right is the tertiary crushing station which incorporates an impact breaker, and a two-stage fine reduction crusher. Conveyor C10 (see flow and plan diagrams) feeds the screen above the 3-cell metal stockpile at the left.

have found from experience to be most desirable.

Apart from producing a number of units of their own design, Jaques Bros. Limited are licensed to manufacture the products of Traylor Engineering and Manufacturing Co., Allentown, Pa., U.S.A., and also the Lorain range of excavators and mobile cranes produced by the Thew Shovel Company, of Lorain, Ohio.

Plant Requirements The top capacity of the Tullamarine plant is approximately 250 long tons (280 short tons) per hour of all required gradings. The normal range of sizes of materials produced is as shown in the accompanying table.

Size Designation	Nominal Range of Sizes	
Metal Sizes	**Passing**	**Retained**
2½ in.	2½ in.	2 in.
2 in.	2 in.	1½ in.
1½ in.	1½ in.	1 in.
Screenings Sizes		
¾ in.	¾ in.	⅜ in.
⅜ in.	⅜ in.	½ in.
½ in.	½ in.	⅜ in.
⅜ in.	⅜ in.	¼ in.
¼ in.	¼ in.	⅛ in.
⅛ in.	⅛ in.	⅛ in.
⅛ in. (Grit)	⅛ in.	1/16 in.
1/16 in. (Dust)	1/16 in.	—
Crushed Rock		
1½ in.	1½ in.	—
¾ in.	¾ in.	—
Graded Rubble		

Approximately minus 1½-in. scalpings with the finer fractions containing more plastic material removed.

The "crushed rock" products mentioned above are an "all in" product and require a high proportion of the finer fractions in order to comply with the specifications of the County Roads Board of Victoria—the Highway Authority for the State of Victoria.

All sizes and sizing mentioned above are determined on British Standard square-mesh test sieves.

Quarrying The stone is a deep blue, nonplastic, fine-grained, columnar-jointed Older Basalt having a specific gravity of 2.9. It is extremely tough and durable, having a Los Angeles abrasion test of approximately 11-12 percent loss.

The deposits are extensive, and it is conservatively calculated that there are at least 20 million cu. yd. of first-quality stone.

Two quarry faces have been developed to a height of about 50 ft. Overburden varies from nil to a maximum depth of approximately 11 ft.

Drilling operations are carried out with an Ingersoll-Rand Drillmaster. Drill holes, of 6-in. diameter, are spaced 18 ft. back from the face on 18-ft. centers. Normally about six to eight shots are fired in a row at a time. The holes are loaded with 8 percent Gelignite to trigger ammonium nitrate, which is mixed with 6 percent of fuel oil before being loaded into the holes. Millisecond-delay blasting is used, the total amount of explosives consumed being approximately one pound per 5-cu. yd. of stone broken. No secondary blasting is necessary.

Quarry loading is done by two identical 3½-cu. yd. Lima diesel-powered shovels. These load the rock into two 22-ton 31TD Euclid rear-dump trucks. The haul to the crushing plant is at present approximately 700 ft.

Primary Crushing Material delivered by the quarry trucks is tipped into the 40-cu. yd. fabricated steel receiving hopper at the crushing plant.

A 42-in. by 12-ft. apron feeder, fitted with a hydraulic variable-speed control unit, delivers the material from the hopper to a static grizzly with bars spaced about 4 to 5 in. apart. Oversize material from the grizzly passes directly into a 30- by 42-in. jaw crusher for reduction to about minus 8-in. size before discharging onto conveyor C2.

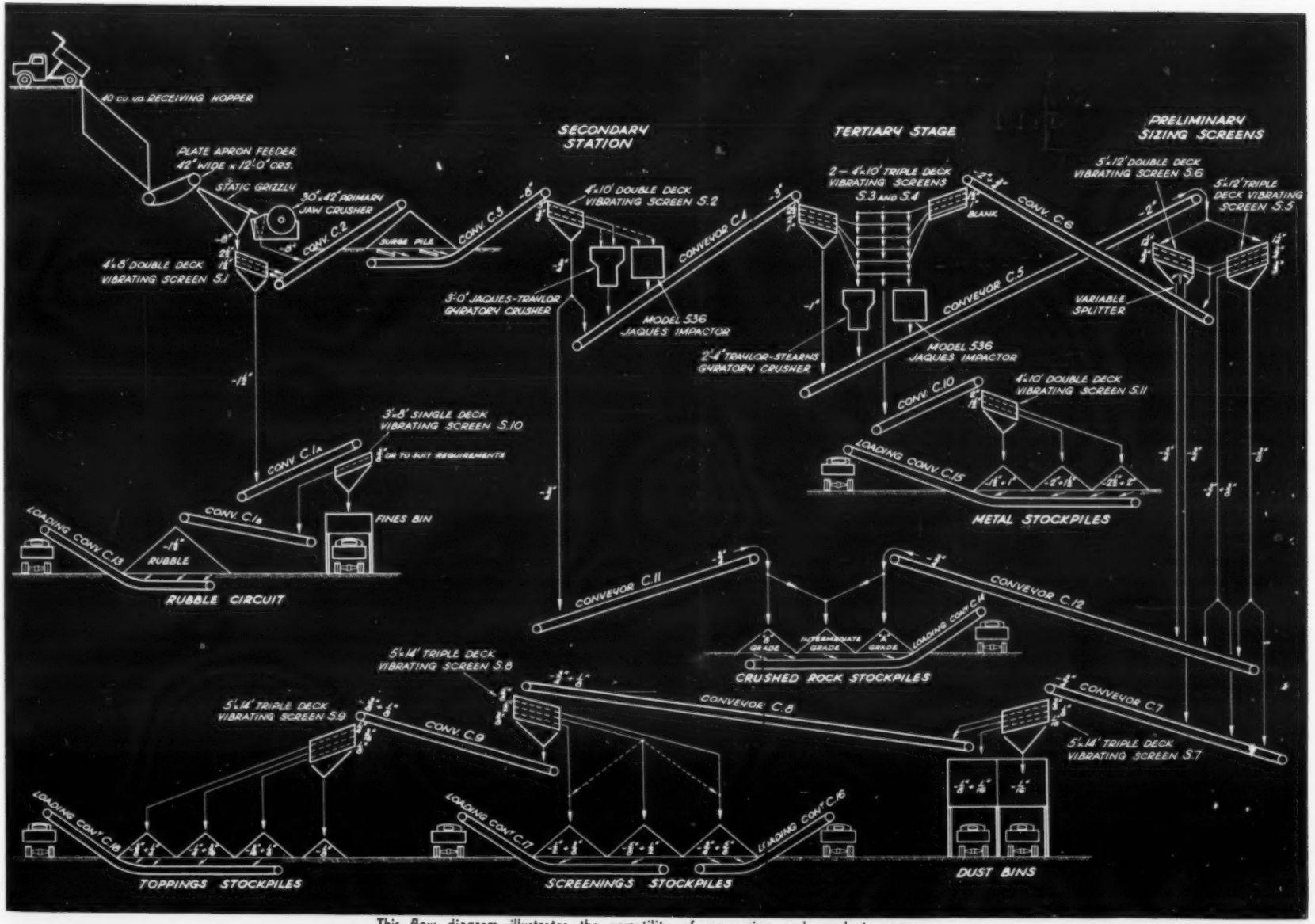
Undersize material from the grizzly passes to 4- by 8-ft. double-deck scalping screen S1. Overs from both screen decks (approximately 2½- and 1½-in.) recombine and, after by-passing the primary jaw crusher, are directed to the tail end of conveyor C2, where they further combine with the primary crusher product.

Conveyor C2 (36 in. wide by 197 ft. on centers) discharges onto a ground surge stockpile of approximately 3,500 cu. yd. total capacity.

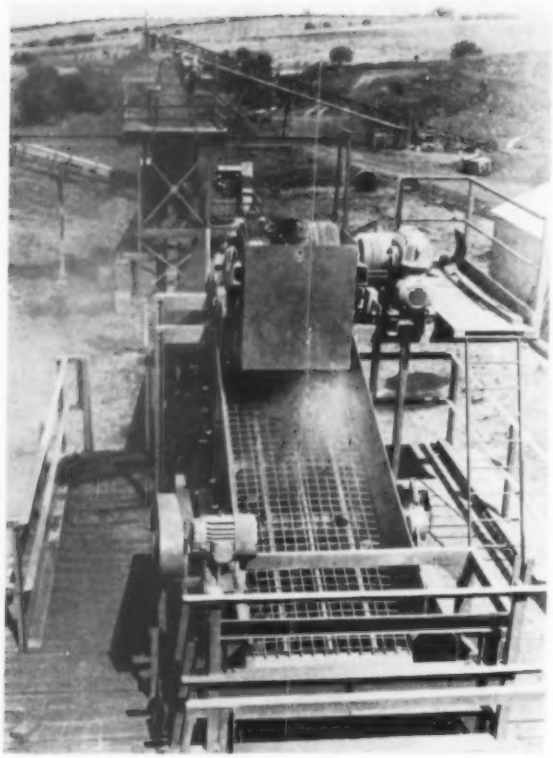
Rubble Circuit Minus 1½-in. undersize material from screen S1 passes onto 18-in. by 122-ft. conveyor C1A and is then directed to a 3- by 8-ft. single-deck screen (S10) mounted on the top of a 21-cu. yd. loading bin. The purpose of the screen is to remove the finer fractions from the material before it passes to 18-in. by 25-ft. conveyor C1B and thence to an 800-cu. yd. rubble stockpile.

Secondary Section Minus 8-in. material from the surge pile is recovered in a concrete reclaiming tunnel by two 30- by 60-in. Locker electric vibrating feeders. These units are positioned to give a live recovery capacity in the surge pile of approximately 1,000 cu. yd.

The reclaimed material is directed onto 30-in. by 190-ft. con-



This flow diagram illustrates the versatility of processing and product range.



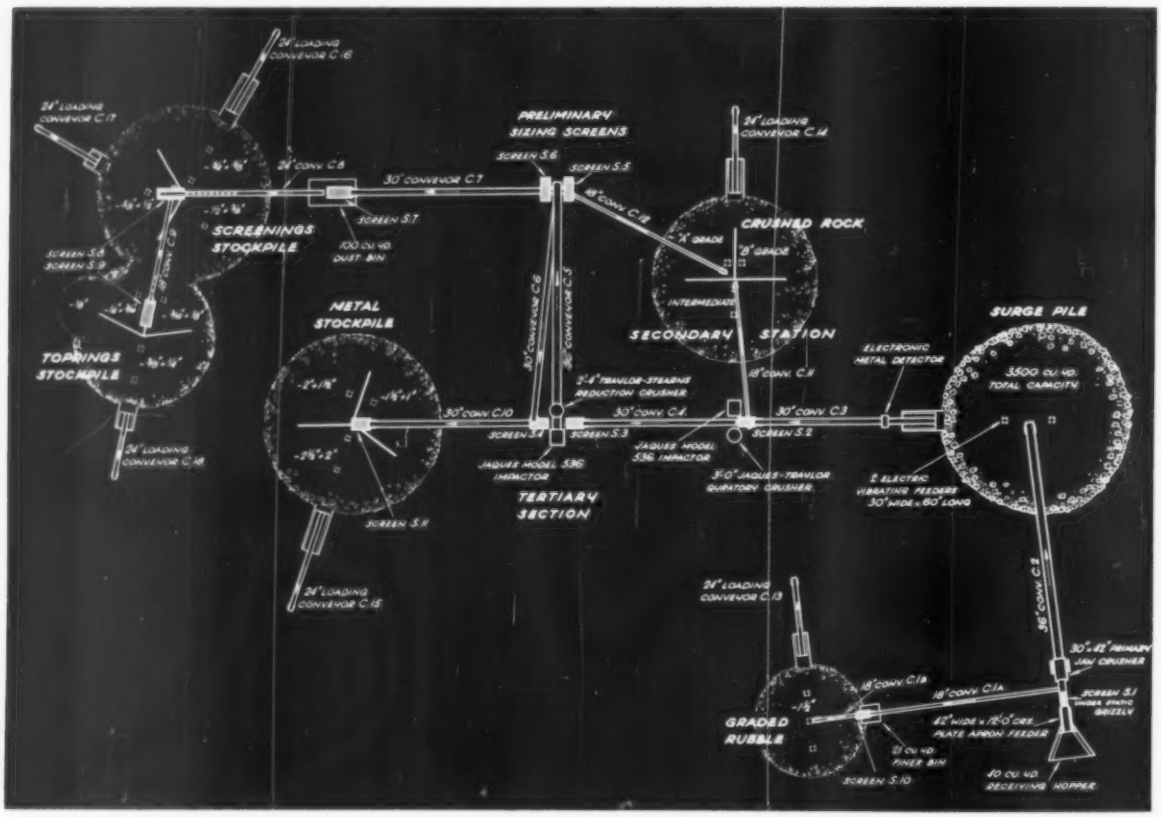
A VIEW from the top of the tertiary station back toward the secondary, which is equipped with a gyratory and an impact breaker. Behind the secondary station a part of the surge can be seen.

veyor C3, which passes through an electronic metal detector. In the event that tramp metal is present, the detector stops the electric feeders, and also conveyor C3.

The latter discharges onto 4- by 10-ft. double-deck screen S2. The top deck is a perforated plate with 5-in. diameter holes, and the bottom deck is wire mesh of ¾-in. square apertures. Oversize from the top deck is fed to a 3-ft. Traylor gyratory crusher having a 12-in. feed opening, ⅝-in. stroke, and set to about 1⅛ in. on the closed side.

Minus 5- plus ¾-in. material passing over the lower deck is directed to a Jaques Model 536 Impactor (impact breaker) having a rotor 5 ft. in diameter by 36 in. wide, and running at a speed of 290 r.p.m. Minus ¾-in. undersize from the screen is either directed onto conveyor C11 (18 in. by 85 ft.) to the "B" grade crushed rock stockpile, or it alternatively by-passes the secondary crushers and recombines with the crushed product on con-

The ground plan of the Tullamarine plant shows the physical separation of various processing stages.



veyor C4, which is 30 in. wide on 130-ft. centers.

Tertiary Stage Crushers in the tertiary stage include a Jaques Model 536 Impactor, identical with that in the secondary stage, except that the machine runs at a higher speed (340 r.p.m.). Capable of either working in parallel with the tertiary or acting as a secondary to it (in other words, as a fourth-stage unit in the plant), is a Traylor-Stearns 2-ft. 4-in. two-stage fine reduction crusher. This crusher was purchased second hand and was installed as an interim measure pending the purchase and installation of a larger unit.

Conveyor C4 discharges material onto a 4- by 10-ft. triple-deck screen S3. As will be seen from the flow diagram, the oversize material from each of the three screen decks may be directed either to conveyor C10, leading to the metal stockpile, or to either or both of the tertiary crushing units. The decks of screen S3 separate 2½-, 2- and 1-in. nominal sizes. Minus 1-in. material passing the lower deck of the screen by-passes the tertiary stage and combines with the product from the two tertiary crushers on conveyor C5, which has 150-ft. centers, and a 36-in. belt.

Material from the head end of conveyor C5 is divided equally to two 5- by 12-ft. screens (S5 and S6). Screen S5 is a triple-deck unit with 1¼-, ¾- and ⅜-in. nominal size meshes; S6 is a double-deck screen having 1¼- and ¾-in. meshes. The top deck of each screen has been introduced purely as a scalping medium to lessen the load on the ¾-in. deck. The overs from the top and second decks of both screens recombine and are directed onto 30-in. by 130-ft. conveyor C6.

Plus ¾-in. material from this conveyor discharges onto a 4- by 10-ft. triple-deck screen identical to screen S3, but having a 1½-in. top deck, 1-in. middle deck, and a blank lower deck. Overs from both the top and middle decks can be directed either to conveyor C10 leading to the metal stockpile, or to either or both of the tertiary crushers. Material passing the 1-in. mesh, and retained on the bottom blank deck, may also be directed to either or both of the tertiary crushers.

By means of a complex distributing box, through which various sizes of materials may be directed in numerous directions through 17 discharge openings, the plant is provided with a marked degree of flexibility.

With the distributing box incorporated in the flow, it is possible to make metal-size material from the secondary crushing stage only. Alternatively, where it is necessary to meet rigid specifications regarding particle shape, 2-in. and 1½-in. nominal size metals may be produced from the tertiary section only. As an added alternative, a mixture of metal from the secondary station and the tertiary stage is possible.

Furthermore, two sizes of metal may be made in the secondary section, concurrently with one other size from the tertiary stage or vice versa. The distributing box also permits the load on the two tertiary units to be closely balanced under varying conditions of operation.

Metal Screening Materials selected at the tertiary stage for metal-size aggregates are directed by the distributing box onto 30-in. by 150-ft. conveyor C10. The latter discharges onto a 4- by 10-ft. double-deck screen (S11) identical to screen S2. Overs from the 2-in. top deck comprise 2½-in. metal, *i.e.*, minus 2½- plus 2-in. nominal size material. Retained on the 1½-in. lower deck is 2-in. metal *i.e.*, minus 2- plus 1½-in. material. The fraction passing the lower deck comprises minus 1½-in. material out of which minus 1-in. material has previously been removed, thereby giving 1½-in. metal.

Screen S11 is mounted 40 ft. above ground level on a steel structure which is in the form of a "Y." The structure is timbered on each section of the three radii of the "Y," and thus divides the stockpile into three sections for the storage of the individual sizes of metal aggregates.

Crushed Rock Circuit Minus ¾-in. material from screen S5 may be directed either to the crushed rock stockpile, or for further screening and storing in the screenings circuit. The bulk of the minus ¾-in. fraction from screen S6 is always sent to screenings production; but, by means of a movable splitter, a certain amount of the material passing through the upper end of the lower deck may be added to the minus ¾-in. material from screen S5 and directed to the crushed rock storage along conveyor C12 (18 in. by 142 ft.).

Crushed rock, to comply with the Roads Board's specifications, requires a high proportion of fines—a proportion which is, in fact, higher than that normally produced in a straight crusher-run. It is for this reason that a certain amount of material is added from the upper end of the lower deck of screen S6. The finer fractions naturally tend to pass through the upper end of the lower mesh in preference to the coarser fractions; and, by means of the variable splitter mentioned above, the proportion of fines in the crushed rock can be varied within reasonable limits.

Crushed rock is stored in a three-compartment stockpile having division walls of steel with timber planking of similar design to that described above for the metal stockpile. "A" grade crushed rock passing from the head end of conveyor C12, and "B" grade crushed rock from conveyor C11 may, if desired, be mixed in any desired proportions in a chute, to form an intermediate grade of crushed rock for independent storage in one of the three cells of the stockpile.

The bottom ⅜-in. deck of the screen S5 was introduced to permit minus ⅜-in. material to be produced and stored, if at any time desired, in one or more cells of the crushed rock stockpile.

Screenings Production Minus ¾-in. material from screens S5 and S6 is directed to 30-in. by 160-ft. conveyor C7, which discharges onto a 5- by 14-ft. three-deck screen mounted on the top of a two-compartment, 100-cu. yd. storage bin. The decks of the screen are ⅜-, ⅛- and $\frac{1}{16}$-in. mesh, respectively. The purpose of this screen is to remove as much of the dust *i.e.*, minus ⅛-in. material, as possible prior to the final screening stage.

At the same time a separation of

the 1/16-in. fraction of the material from the minus 1/8-in. material is effected in order to obtain a minus 1/8- plus 1/16-in. "grit" product. Storage of the "grit" and minus 1/16-in. dust is in each of the 50-cu. yd. compartments of the bin, which is elevated to allow for direct truck loading underneath. The top 3/8-in. deck of the screen was introduced purely as a load-lessening medium for the 1/8-in. middle deck.

Materials passing over the ends of the top and middle decks recombine to form a minus 3/4- plus 1/8-in. product which is transferred by conveyor C8 (24 in. by 119 ft.) to a further 5- by 14-ft. three-deck screen fitted with 5/8-, 1/2- and 3/8-in. screening decks.

This screen is elevated 45 ft. above the ground. As in the case of the metal storage described previously, the structure is of steel and timber construction in the form of a "Y" which divides the stockpile into three sections for the storage of individual sizes of screenings. Material passing over the end of each deck is directed into one cell of the stockpile, which thus stores 3/4-, 5/8- and 1/2-in. screenings.

SOME FINISHED PRODUCTS. From left to right (see also ground plan) are screens 9, 8, and 7. Stockpiles under the first two are toppings and screenings, respectively. The bins below screen 7 contain dust and grit. At the left is a part of the stockpile below screen 11.

ONE OF THE SIX LOADING CONVEYORS is seen in this view. They are controlled from panels on the head-end support frames.

Arrangements are provided in the chutes leading from the screen to the various cells of the stockpile for mixing variable proportions of 5/8-in. material with either or both the 3/4-in. and 1/2-in. screenings.

Minus 3/8-in. material passing through the lower deck of the screen is carried on 18-in. by 51-ft. conveyor C9 to screen S9. This is also a 5- by 14-ft. three-deck unit, having 1/4-, 3/16- and 1/8-in. mesh sizes, respectively. Screen S9 is mounted on a structure of similar construction to that described above for screen S8, and the oversize material from each deck is directed to one cell of the stockpile which stores 3/8-, 1/4- and 3/16-in. screenings, or "toppings," as they are frequently called.

Material passing the lower deck of the screen is minus 1/8-in. that has not been removed by screen S7; this material, which is relatively small in quantity, is led by a chute to a small stockpile adjacent to the main three-cell stockpile.

Reclaiming and Loading Under each of the stockpiles, divided, as mentioned above, into three compartments (excepting the graded rubble), is a concrete reclaiming tunnel. Each tunnel houses a 24-in. wide conveyor with the discharge end arranged at a height suitable for directly loading the material into trucks. The material from the various cells of the stockpile is carried through 18-in. square openings in the tunnel roof to clamshell-type gates. The latter are operated by means of hydro-electric thrustors which are electrically interlocked so that the gates cannot be opened unless the respective loading conveyor is running.

For the 3/4-, 5/8-, and 1/2-in. screenings stockpile, two tunnels and two loading conveyors are provided; one for the 3/4-in. screenings exclusively, the other for the 5/8-in. and 1/2-in. materials. A total of six loading conveyors served by 19 gates in reclaiming tunnels are provided.

The loading rate of each conveyor is approximately 3 tons per minute. The loading conveyors with their respective hydro-electric thrustors are controlled from individual switchboards mounted on the

support frame for the head end of the various conveyors.

Screens All screens are of the vibrating type, manufactured by Jaques Bros. Limited. The screens are either heavy-duty, four-bearing, or medium-duty, two-bearing units. A summary of the screens in the plant is given below:

Screen No.	Size	No. of Decks	Type	No. of Bearings
S 1	4 x 8 ft.	2	Cascade	4
S 2	4 x 10 ft.	2	Cascade	4
S 3	4 x 10 ft.	3	Cascade	4
S 4	4 x 10 ft.	3	Cascade	4
S 5	5 x 12 ft.	3	Rapide	2
S 6	5 x 12 ft.	2	Rapide	2
S 7	5 x 14 ft.	3	Rapide	2
S 8	5 x 14 ft.	3	Rapide	2
S 9	5 x 14 ft.	3	Rapide	2
S10	4 x 10 ft.	1	Cataract	2
S11	4 x 10 ft.	2	Cascade	4

All mesh sizes mentioned in this article and indicated on the flow sheet are nominal only. In most cases the actual aperture of the mesh is slightly larger than the nominal size of product, *e.g.*, $^{13}/_{16}$-in. apertures for the ¾-in. product.

Conveyors All conveyors are run in the speed range of 225 to 250 f.p.m. They are of standardized sectionalized construction, and are equipped with three-bearing type troughing idlers arranged for grease lubrication.

With the exception of conveyor C2, the drive to all conveyors is at the head end through worm reducer units.

In the case of conveyor C2, which is cantilevered at the head end over the surge pile, the driving equipment was made as a ground unit in order to reduce the weight of the conveyor at the head end. The motor on C2 is 40 hp., and the worm box is 12-in. o.c. All conveyors handling material larger than approximately 1½ in. are equipped with rubber impact idlers at the feed points.

A gravity type take-up is used on practically all of the 30-and 36-in. conveyors. In most cases, the angle of inclination of conveyors at the feed points is under 10 degrees, and after passing through a radius of curvature of 200 to 250 ft., the conveyors terminate at angles not exceeding 18 degrees to the horizontal.

Electrical System Electric power is received at 2,200 volts and is stepped down at a transformer station to the 415-v., 3-phase, 50-cycle supply used for all plant motors.

Operation of the plant is controlled from a central control station equipped with an illuminated layout panel which indicates various operating phases. All possible safety devices have been incorporated into the system to ensure that the various component units can be started only in their correct sequence, and in the event of a break-down, that all units ahead of the failure are automatically halted. Test selector switches are provided on all starters so that individual items of equipment can, if desired, be taken out of the sequence and run individually when required.

As mentioned previously, each loading conveyor is equipped with an individual switchboard in a position convenient to the truck-filling point. These switchboards control the starting and stopping of the loading conveyors and also the respective hydro-electric thrustors operating reclaiming gates under the stockpiles.

Plant Additions A 100 t.p.h. bituminous hot-mix plant has just been erected at the site of the crushing plant. The hot-mix plant and a proposed cement concrete plant will be provided with raw material feed from a separate screening, stockpiling, and reclaiming section which receives its feed from the head end of conveyor C8. Screen S6 will be equipped with a 1½-in. mesh on the top deck, and the chutes will be slightly modified so that minus 1½-in. material can, when desired, be sent up conveyors C7 and C8 and thence to the new section.

The chute at the head end of C8 will be so arranged that an infinitely variable proportion of material can be sent either to screen S8 or to the conveyor leading to the raw material screening and storage section for the bituminous hot-mix and cement concrete plants.

Future Developments Bayview Limited is at present developing a quarry site at Montrose, which is about 20 miles from Melbourne. The plant for this project is in the course of manufacture by Jaques Bros. Limited, and while it will contain many of the features of the Tullamarine plant, it will also incorporate additional items such as a larger primary crusher; a larger surge pile; increased tertiary crushing capacity; rescreening of the smaller size aggregates to remove dust, etc., immediately prior to truck loading; a combined system of material storage to suit truck loading and raw material supply for the future bituminous asphalt and cement concrete plants.

Wichita Falls S-G Company Bought by Gifford-Hill

Gifford-Hill and Company, Inc., Dallas, Tex., has purchased all assets of the Wichita Sand & Gravel Company, Wichita Falls, Tex. The latter firm operates two sand and gravel washing plants, and is the oldest ready mixed concrete producer in that city.

The partners of Wichita S-G, Tom C. Foley, Jack D. Foley, and John J. Gavin, will retain their present offices.

New processing equipment was recently installed at Arsenal Sand and Gravel Company, New Brighton, Minn. Present capacity is 200 t.p.h. of washed sand and gravel, and 450 t.p.h. of dry crushed sand and gravel.

A new sulphur mining and processing plant, which cost over $1,000,000, was recently opened by the U. S. Sulphur Corporation at High Island Dome, 38 miles east of Galveston. Anticipated output is described as 1,200 t.p.d. Deposits already mined by the Frasch method have yielded 99.4 percent pure sulphur. The firm also plans construction of a $6,000,000 sulphuric acid plant within a year.

Credit Unions in Action

CURTIS R. McMakin received a phone call at 8 o'clock one night, informing him that his father had been seriously injured in an accident in Shreveport, La., several hundred miles away. Mr. McMakin, who is employed at Maule Industries, Miami, Fla., immediately called the Maule Employees Credit Union. Within two hours he was flying to his father's bedside, assured that he would have the money he needed to cover the hospital expenses; and at three o'clock the next afternoon he received a check from the firm's credit union.

Not all credit union loans are made under circumstances so dramatic, but Mr. McMakin's case illustrates the speed and convenience with which a credit union member can get a loan.

CREDIT UNIONS IN NONMETALLIC INDUSTRIES

Currently there are 130 credit unions run by employees of firms producing cement, crushed stone, gypsum, lime, sand, gravel, and slag. (Another 115 credit unions serve employees of companies in allied fields—most of these in the glass industry.)

About 80 percent of the 20,000 credit unions in the United States are owned by employee groups, but all such unions operate in the same way.

A recent survey of all credit unions in the nonmetallic industries was made to find out how they operate, and why company management is interested in them.

Replies were received from more than 50 percent of these groups, and in some cases they were accompanied by statements from management.

In a typical instance, J. C. Wain, assistant personnel director of Maule Industries, stated, "Prior to the establishment of the Maule Industries Credit Union, the involvement of the company in the personal debts of its employees was high. The credit union was established to aid employees solve their financial problems and to encourage thrift. Now that the credit union is in operation, far fewer letters dunning employees for overdue bills are received, and seldom is a wage levy processed. We feel this is due to the development of better savings habits by the credit union members and to more favorable terms than can be obtained at many lending institutions."

Maule Industries employees' credit union is typical of many such industrial credit setups. It began operations with less than $100 in assets in 1955. Today 615 members together have saved more than $150,000.

One of the oldest credit unions in the cement industry is that of the Northwestern States Portland Cement Company in Mason City, Iowa. It was formed in 1934, and now has 568 members with savings of $380,000. The company provides payroll deduction and allows the part-time credit union treasurer to use office space.

The credit union serving employees of the Huron Portland Cement Company, and Huron Transportation Company in Alpena, Mich., is one of the largest groups of this type in the entire nonmetallic minerals industry. Organized in 1950, it now has 1,874 members. As of July 31, 1959, they had saved $1,197,810 in their credit union. During the first six months of 1959, the credit union made loans to its members totalling $920,703.

CUTS DOWN GARNISHMENTS

All but a few of these credit unions were started with company impetus because management saw a

Howard Baker, personnel manager (left), and Robert Walker (right) have been members of Pittsburgh Corning Federal Credit Union since it was formed in 1956. More than 80 percent of the employees at the Port Allegany, Pa., plant of Pittsburgh Corning Corporation and their families are members.

employee self-help makes good employee morale

Herbert Jahncke of Jahncke Service, Inc., New Orleans, La., sits in with the credit union treasurer, Mrs. Edwin Coshow, and the chairman of the supervisory committee, Peter Meo, during a quarterly check-up.

need to help employees avoid garnishments and high rate money lenders.

R. J. Johnson, plant employment manager of the A. P. Green Fire Brick Company in Mexico, Mo., says, "It is the opinion and feeling of the management of the A. P. Green Fire Brick Company that the credit union is of much value in establishing and maintaining good employee morale, and is very effective in helping to keep employees from having garnishments issued against them."

At Lehigh Portland Cement Company's credit union in Mason City, Iowa, the treasurer reports, "We have loaned money to many members to pay off high interest loans . . . money to keep wages from being attached." One member here owed $4,000 to 20 creditors. Instead of making a loan, the credit union helps him distribute his check every month to pay off a little on each of his bills.

At Pittsburgh Corning Corporation, assistant works manager Robert E. Walker says, "Before we had the credit union, our employees were forced to borrow at terrific interest rates. Many were deeply and perpetually in debt. The credit union has done a lot to alleviate this situation." Howard J. Baker, personnel manager, adds, "We have had very few requests for financial assistance since the credit union began to serve employees at our plant. The rapid growth of our credit union has proved that there was, and is, a great need for it."

Although a company may encourage and even help start a credit union in the plant, this organization actually is a separate nonprofit corporation, entirely owned and operated by employee members.

HOW CREDIT UNIONS WORK

Simply defined, a credit union is an organization of people who save their money together and make loans to each other for good purposes at low interest rates. By law, members of a credit union must have a common bond, such as that of working for the same employer.

Credit unions must be chartered under either state or federal law, and they operate under government supervision. All credit union workers who handle money must be bonded.

Members elect a board of directors, a credit committee to approve loans, and an auditing committee to conduct regular examinations of the credit union's books. By law, all officers, directors, and committee members must serve without pay, except the treasurer, who is also the credit union's manager. As the credit union grows larger, he may be paid for his work.

The maximum amount of interest a credit union can charge on any loan is 1 percent per month on the unpaid balance. After expenses have been paid and a reserve for safety is set aside, any remaining surplus is distributed to members in the form of dividends on their savings. The most common dividend paid in the last few years has been 4 percent. Many credit unions also make refunds on the interest their borrowers pay; the most common interest refund rate is about 10 percent.

It is generally recommended that there be at least 100 persons in any group of employees who may be considering the organization of their own credit union, but many operate successfully with fewer members. For example, only 65 employees of the Hill Brick Company in East St. Louis, Ill., formed a credit union in 1956; they now have saved a total of $20,000.

GOOD REPAYMENT RECORD

One of the most amazing facts about credit unions is their extremely good loan repayment record. During the last 25 years less than 0.5 percent of the billions of dollars that have been lent have been written off as uncollectible!

The credit unions in the nonmetallic industries have an equally fine record. "The boys here try to meet, and do meet, their payments conscientiously because they know if we are ever to write off a loan, it will involve their money also," says Mary Ann Allement, treasurer of the credit union at Ideal Cement Co., in Baton Rouge, La.

The Birmingham Slag Credit Union (for Vulcan Materials employees in Birmingham, Ala.), which has been operating since 1936, has never had to write off a loan as uncollectible.

The Universal Atlas Cement Division (U. S. Steel Corp.) credit union at Gary, Ind., has been operated for 20 years. It has 802 members with $300,000 in assets, and it has never written off a loan.

OPERATING PRACTICES

The survey of 71 credit unions in the nonmetallic industries showed how they fit into company operations.

Thirty credit unions reported regular office hours on a part-time basis, usually before or after work, evenings, lunch hours; some were open two days a week. Larger credit un-

ions are open five days a week, if there are full-time employees. Most of the smaller credit unions, however, have an informal arrangement with management to take care of members' needs during working hours.

As one treasurer of a cement company credit union reported, "Management has not given us any trouble—the directors transact considerable business in the plant in a quiet way, and we find we get along very well, being careful that in being given this inch of leeway, we do not take a mile."

Eleven of the credit unions surveyed had full-time treasurers, paid by the credit union. The other 60 operated with a part-time treasurer.

This survey showed that 56 companies, or more than three-quarters of those surveyed, provided office space for the credit union.

Management help is appreciated, but according to a spokesman of the Credit Union National Association (C.U.N.A.), they encourage credit unions to stand on their own feet! "Although credit unions are non-profit organizations run by volunteers . . . we urge them to be self-supporting, and pay for office space if they operate on the company property," he said.

Most credit unions in the nonmetallic minerals industries enjoy the payroll deduction privilege. (Of the 71 firms surveyed, 64 made payroll deductions for employees' credit union savings and loan payments.)

Herbert Jahncke of Jahncke Service, Inc., New Orleans, whose enthusiasm for his company's credit union at the National Sand and Gravel Association's convention last winter prompted this article, has this to say about the payroll deduction question:

"Though not essential to a credit union, we have permitted payroll deductions to be made for both saving and repayment of loans. If we did not have this setup, it would be necessary to designate time and days for payment of loan instalments and for savings deposits. Employees would take time off or have to arrange for members of their families to handle payments; and the credit union would probably require additional outside help. A substantial amount of cash would be handled, as payroll deductions in our company now average approximately $10,000 monthly. The tabulating department processes this volume of transactions with the minimum of effort."

Interplant mail privileges make operation easier for the credit union at Gladding, McBean and Company in California, which serves in seven plants.

MANY KINDS OF HELP

"We find that we save our shareholders up to 10 percent of the purchase price of a new car in interest savings," says A. M. Stewart, assistant treasurer of Consolidated Rock Products Company Employees Federal Credit Union in Los Angeles.

Most credit unions admit into membership the wives and children of employees, and many encourage children's thrift accounts. "We have possibly 100 children in our credit union," reports a spokesman for the Owens Illinois Glass Company credit union at Glassboro, N. J.

Permanente Cement Company has 785 members in its credit union; a full-time treasurer is in charge in an office on the company premises. This credit union made $168,000 in loans during the first six months of 1959. "We have helped quite a number of people," the treasurer reports, "from the Mexican laborers to the white collar workers. We have made loans to put down payments on homes and for maternity expenses."

Even a small credit union can be a real boon to workers. For instance, the employees at U. S. Ceramic Tile Company, East Sparta, Ohio, started their credit union in 1958. The first nine loans they made, when they had total assets of only $1,500, included one to buy glasses for a member and his son, a loan to meet payments to a loan company, and another to help a worker's daughter return to nursing school.

Such down-to-earth human benefits as these, plus the self-help feature of credit unions, are the main reasons given by management men to encourage credit unions in the nonmetallic minerals industries.

STABILITY

How do credit unions hold up when the going gets rough—for instance during layoffs or strikes? In Oklahoma, employees at Pittsburgh Plate Glass were laid off while the furnaces were down for repairs, and again during a strike that kept men home from November, 1958, to February, 1959. During that time the Glassworkers Federal Credit Union kept its head above the water. According to treasurer John Wegley, "We had to carry nearly every loan we had through that period without any payments." He added that members withdrew half their shares, but that total savings were soon built back to a higher figure than before the trouble. The union's growth and stability has been enhanced greatly since February, 1959.

"Layoffs actually speeded our growth," says Joseph Connolly, treasurer of the Port Allegany, Pa., Pittsburgh Corning Federal Credit Union. Service to members during these periods builds loyalty. He adds: "In the glass industry, layoffs of several weeks are normal; but it was six weeks last winter. Members' loan payments fell off to near zero among hourly workers. During the layoff, other members who had the means put more in their savings accounts. The credit union liquidated some of its outside investments, and came through the layoff in good shape. After each layoff period our members and potential members show an increased interest in their credit union."

SUCCESS REQUIRES EFFORT

While most of the credit unions in the industry are doing a good job, there are a few which are dormant, and do not really give the members the service they need. The success of a credit union depends on the willingness of officers to work hard in educating the members in thrift, and in teaching them how the credit union can help them.

Any group that begins a credit union can get plenty of help, however, from neighboring groups, and from the league of credit unions in its state — a nonprofit association which provides professional help at no charge in getting credit unions organized.

More information or help in starting a credit union can be obtained without cost or obligation by writing to Credit Union National Association (C.U.N.A.), Madison 1, Wisconsin. End

Enter 111 on card, page 197 →

Ford 1801 Series Industrial diesel tractor with Ford Super-Duty loader

FORD PRODUCTIVITY REPORT

George Kalinovik, manager
National Coal and Oil Co.,
Detroit, Michigan

"My Ford loaded 10,000 tons of coal last year—fuel cost about 2¢ a ton"

Mr. Kalinovik reports: "We load from 15,000 to 20,000 tons of coal a year—over half of it by loader into trucks or conveyor hoppers. This figures out at roughly 33 tons a day, from one to two hours of actual tractor work, and fuel for my Ford is about a gallon or 16¢ worth an hour. I can do five times as much work with the Ford as with my old loader. It's a much bigger bucket, and more important to me, power steering makes handling easy even where trucks have cut ruts in the yard. With the old loader, my arms got so tired they'd be shaking after I worked for a while. We load high-sided trucks we couldn't even reach before without a conveyor. We push rail cars wherever we want them. We even use the loader as a jack to change truck tires. We get all this with Ford—speed, big capacity, high dump, easy steering and low fuel cost. What more could you ask?"

Ford Motor Company

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Ford 801 Series Powermaster tractor with heavy duty front end, Ford Extra Heavy Duty loader, Ford 12' backhoe.

FORD PRODUCTIVITY REPORT

Robert Rogers, owner
Handy's Trucking Co.,
Wallingford, Conn.

"I put a quarter-yard power digger in dead storage after I got my Ford"

Mr. Rogers reports: "I've had 5 years of backhoe work, and this Ford beats them all. I've got a truck-mounted cable type digger I can't even afford to use any more. The Ford works almost as fast, and doesn't cost near as much to operate. And I can take the Ford into places the bigger rig can't even go. I've got another tractor backhoe, too, but it doesn't compare with Ford. A job that takes 12 hours with the other backhoe, for instance, takes me about 8 hours with Ford. On this sewer job here, Ford will save me at least $75. I like Ford's undercutting, too. Went under a water main on this job and didn't shovel a wheelbarrow full of dirt. Never tear up a sidewalk any more. The only thing I can find wrong with Ford is that my other backhoe isn't one of them. And believe me, it soon will be."

Ford Motor Company

TRACTOR AND IMPLEMENT DIVISION • FORD MOTOR COMPANY • BIRMINGHAM, MICHIGAN

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Small Operation Displays Ability

Service is by-word in Missouri crushed stone plant serving road, agstone markets

By BUREN C. HEROD

ANOTHER ON THE SPOT report

WHEN the quarry now operated by Brooks Quarry Inc. at Kahoka, Mo., was first opened, agstone was unheard of, and dirt roads were arterial routes. At that pre-Civil War time, and until later in the 19th century, when it was abandoned, the quarry provided raw material for lime production in a group of old pot kilns.

Today, this site is the scene of a small modern operation playing a vigorous role in supplying limestone products to both agricultural and road construction markets. Actually, the operation is a young one—the greatest part of its development to current productive capacity of 1,000 t.p.d. having taken place within the last ten years.

In 1948 the long idle property was opened by the predecessor of the Brooks organization. At that time, Arly Brooks, who heads the present operation, his father, and his brother, were all engaged in construction activities. None had ever been in the crushed stone field, but had been considering the feasibility of operating their own aggregate plant. This led to the acquisition in 1950 of the quarry and the small 350 t.p.d. original plant which were advantageously located near their area of construction activity.

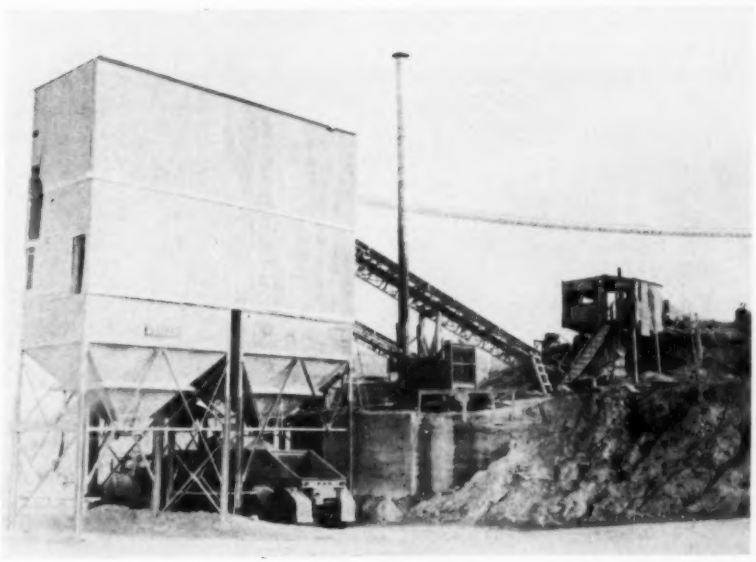
Since that time the facility has been modernized and trebled in capacity through the installation of a second screening line; the provision of a more powerful drive on the secondary crusher, plus the installation of an REA line to supply the various smaller equipment drive motors; and the replacement of wooden structures with steel bins and framework.

The most recent addition was that of a Tornado crusher for greater capacity in the finer sizes. Primarily, this unit is cut into the processing flow to increase agstone production. When it is not on the line, routine crushing and screening results in about 25 t.p.h. of agstone materials in the total product. When it is cut in, this figure is raised to about 60 t.p.h., and the Missouri specifications on agstone fineness are readily met.

To service this market, the company operates three haulage units equipped with Baughman spreaders. In addition, a fleet of four tractor-trailer units, and one tandem end-dump truck are used for delivery. Along with agstone, the firm's basic market includes county road maintenance and state road work. The latter and agstone account for the major portion of sales.

The tract on which the plant and quarry are located contains nearly 100 acres, of which only a relatively small part has been worked out. The St. Louis limestone formation as exposed in the quarry has four ledges —two analyzing over 91 percent available $CaCO_3$, and the other two ranging between 70 and 80 percent.

Although the total working face



An overall view of the compact Brooks plant installation. The crusher used to increase normal agstone production is just to the left of the stack base, center. Steel bins and structures replaced the original setup during modernization.

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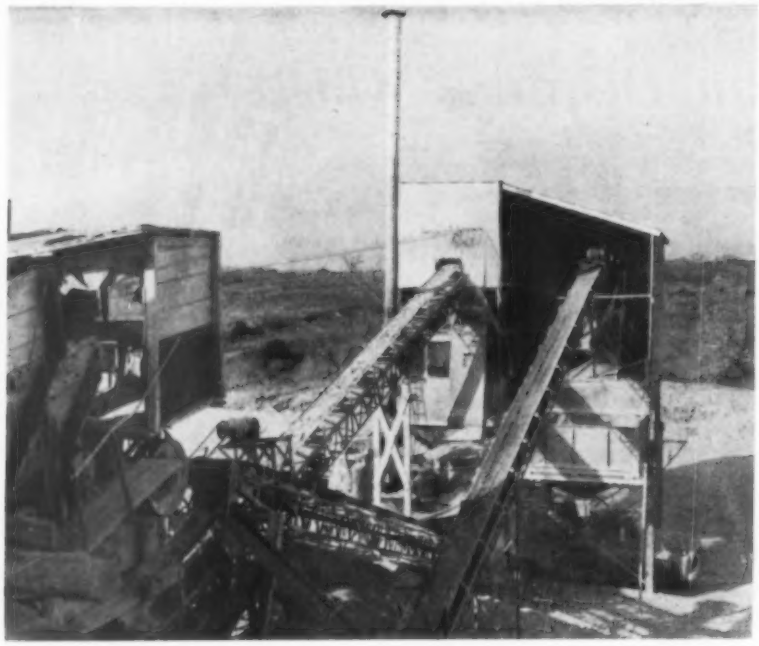


Left: From the primary crusher, left, the flow goes to the first screen in the enclosed section of the bin structure. The return belt from the secondary and fine reduction crushers, lower center, discharges through the pants-leg to either belt—that on the right feeding the secondary screen.

height for the four benches is about 50 ft., there is at least another 20 ft. of quality stone below the present lowest ledge. Seams and jointing in the ledges now being worked are rather well defined, and contribute to the favorable fragmentation experienced.

Blastholes are sunk with a Joy drill mounted on a Farmall Cub tractor, and supplied with air by an Ingersoll-Rand 315 Gyro-flo. The drill is fitted with 2-in. bits, and the maximum hole depth for any ledge is 18 ft. For an average shot, 36 holes are drilled on a staggered 5- by 7-ft. pattern. These are charged with DuPont Xtra C and 40 or 60 percent gel explosives, as required. Yield averages 3½ tons of stone per pound of explosive, and the cost approximates 12 cents per ton of material brought down.

The quarry is operated on four ledges, and the maximum drilling depth on any ledge is 18 ft. This drill is sinking 2-in. holes on a 5- by 7-ft. staggered pattern.

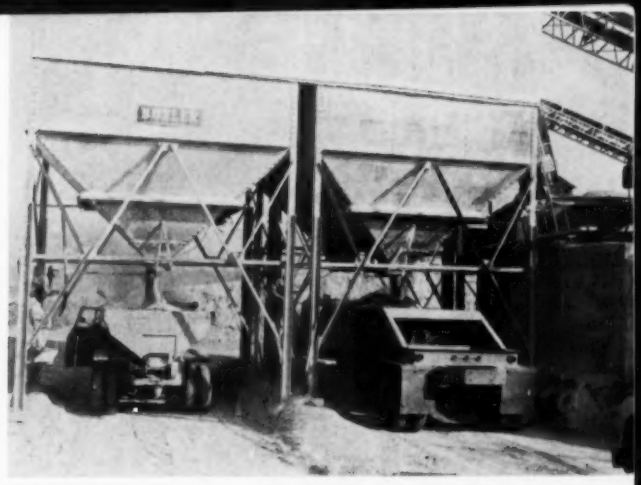
The latter is loaded out by a ¾-cu. yd. Lorain shovel for haul to the plant hopper by a pair of heavy-duty GMC trucks. These units are fitted with 6-cu. yd. Gar Wood dump bodies. A 36-in. by 8-ft. feeder below the hopper delivers the quarry-run stone to an 18 x 36 jaw crusher. Both of these are Pioneer units.

Products of this primary reduction are discharged onto 24-in. conveyor No. 1, and carried to the first of two screens mounted above a set of four Butler bins. The primary screen, a 4- by 12-ft. triple-deck Pioneer unit, makes separations on 1-in., 7/16-in., and 8-mesh opening screencloth on the top, middle, and bottom decks, respectively.

Plus 1-in. material retained on the top deck is chuted to a 3640 Dixie hammermill, which is driven by a Caterpillar D375 diesel engine. The other fractions are chuted to the

Left: Two ledges of the four operated are used to feed the plant when maximum agstone production is required. Well-defined seaming and jointing contribute to excellent fragmentation.

The haulage fleet includes four tractor-trailer units like this one on the scales, plus three lime spreader trucks, and an end-dump unit.



Agstone is loaded into a spreader unit, left, while the trailer at the right is being loaded with road materials.

underlying bins. However, when the 4½-ft. standard Tornado crusher is cut into the flow for maximum agstone output, the middle deck retained fraction is chuted in its entirety, or any desired proportion, to that unit. The latter is driven by a 40-hp. motor.

Products of both crushers are discharged onto 18-in. conveyor No. 2. Discharge from this conveyor enters a pants-leg chute which permits placing the material on conveyor No. 1 for return to the primary screen in closed circuit, or onto conveyor No. 3 (90 ft. c-c with a 24-in. belt) that parallels No. 1, but feeds the second screen.

On this 4- by 12-ft. double-deck Seco screen, the top deck is fitted with 1-in. opening screencloth, and the bottom deck is split with 10-mesh cloth at the feed end and 8-mesh cloth at the lower. The top-deck fraction is chuted into a bin of concrete aggregate, the bottom deck retained stone drops into a bin of road material, and the throughs drop to the aglime bin. Total bin capacity is about 135 tons.

Finished products are transferred from the bin storage to stockpile, or loaded for delivery. In addition to the three Baughman lime spreader units, the truck fleet includes three belly-dump Omaha Standard 13-ton trailers and a 17-ton Hobbs Shonrock cable-dump unit, all pulled by F-600 Ford tractors; and a 13-ton end-dump truck. A ½-cu. yd. Lorain shovel and a front-end loader are used to load this equipment from stockpiles. Shipments are weighed out over an 18-ton Winslow scale. For most effective production control, and dispatching of delivery units, leased G-E mobile radio equipment has been installed.

Under the personal supervision of Arly Brooks, production of this small but energetic and progressive operation is handled by a 14-man crew. Mr. Brooks recently incorporated his business and made his longest-service employees shareholders — a move that enhanced existing high morale and has obviously beneficial effects on interest in efficient operating and sales.

A young operator who learned fast. Arly Brooks heads the Brooks Quarry, Inc. organization.

U.S. Mines Bureau Award Goes to Bestwall Operation

The Clarence Center (New York) mine of Bestwall Gypsum Company has been named winner of the U. S. Bureau of Mines National Safety Competition, 1959, in the nonmetallic division. The mine, a part of Bestwall Gypsum Company's Akron, N. Y., manufacturing operation, worked 265,192 man-hours in 1959 without a lost-time injury.

Winners of the National Safety Contest receive "Sentinels of Safety" bronze trophies provided by *Explosives Engineer* Magazine. Last year, 672 mines and quarries competed in all divisions. Fifty-one mines were in the nonmetallic competition.

The Clarence Center mine also had an accident-free record in 1958, a year in which 213,004 man-hours were worked without a lost-time injury. The company's Grand Rapids, Mich., mine took the division award in 1958.

Matt Fink is safety director for Bestwall Gypsum Company. M. M. Powers is manager of Bestwall's Akron plant. L. Tiedt is Akron safety supervisor, and O. Sherry is mine superintendent.

Construction at the new cement plant of Texas Industries, Inc., at Midlothian, Tex., was slowed down during the severe winter weather, but substantial progress is now being made. Officials expect that the plant will be completed on schedule late this fall.

Deep
sand overburden stripped hydraulically in British Guiana bauxite operation

By W. M. MERCER
Sales Manager
Morris Machine Works
Baldwinsville, N. Y.

ANOTHER R&D EXCLUSIVE

IN AN area about 65 miles inland from the Caribbean coast—accessible only by river or by air—modern mining methods and engineering skills have combined to create a flourishing industry near Mackenzie, in tropical British Guiana. Demerara Bauxite Company, Limited, a subsidiary of Aluminum Company of Canada, Limited, is mining a number of bauxite deposits by open-pit methods, involving blasting and power excavation.

This fact in itself causes no wonder, except that:

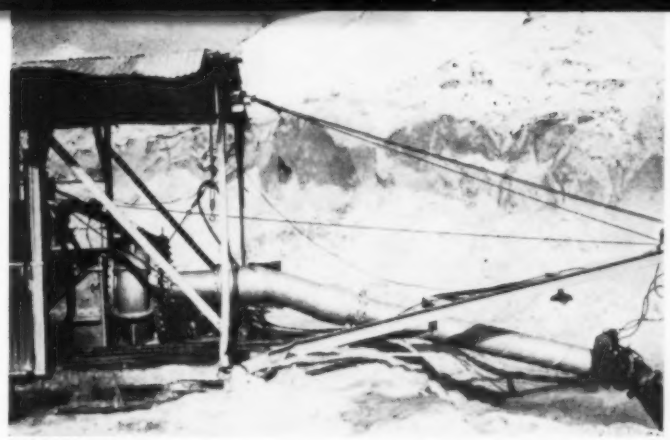
Ore deposits in this area are *50 to 180 feet below the surface* of loose silica sand and clay. Ore can be removed only after the deep sand overburden is stripped away by the hydraulic power of 8,000 g.p.m. of water directed at the sand banks at about 60 to 100 p.s.i. The lower clay is subsequently removed by a walking dragline having a 220-ft. boom.

The fine white silica sand and clay slurry is monitored into a huge sump and then transferred by a centrifugal pump at the rate of 300 to 400 cu. yd. per hour (and a maximum head of 180 ft.) through pipelines nearly 5,500 ft. long.

The hydraulicking installation used in the sand-stripping operation consists of two large steel skids, each 25 by 12 ft., and equipped in essentially the same manner. Mounted on each skid (which literally floats on the sand) are a 12-in. Morris GA slurry pump, a 550-hp. diesel engine, and a derrick for the suction line and

Top: Overburden of loose silica sand and clay at depths ranging from 50 to 180 ft. must be removed before the underlying bauxite can be recovered.

Overburden is monitored into a huge sump, from which it is transferred through nearly 5,500 ft. of pipeline by centrifugal pumps at the rate of 300—400 c.y./h.



Each hydraulicking installation consists of a large steel skid equipped with a 12-in. pump, a diesel engine pump drive, and a suction line derrick.

The hydraulic monitors are positioned radially and vertically by remote control from the sand pump skids.

controls. The entire setup, or "sand pump," together with accessory equipment, is dragged about through the stripping area by a tractor. The equipment has been designed to operate 24 hours per day, 7 days a week.

In operation, the Intelli-Giant hydraulic monitors are positioned radially and vertically by remote control from the sand pump skid. This high-pressure hydraulicking, or water stripping, has proved to be very suitable for the overburden encountered here.

Because of the unusually long discharge line (nearly 5,500 ft.), however, certain problems of pumping velocity and slurry composition had to be resolved before proper equipment application could be achieved.

Critical fall-out velocity, or the point at which the fine, white, highly abrasive silica sand would clog in the discharge lines, was determined after exhaustive tests made by engineers. Normally, a 12- to 14-in. discharge line would be used with pumping equipment such as installed by Demerara Bauxite.

However, the terrain of the mining area necessitated the use of a 5,000-ft. plus discharge line; and using a smaller-diameter pipe for that distance would mean an investment in an extra booster pump and additional capital expense to insure adequate material-flow volume. It was found that the necessary velocity of 11 f.p.s. through the discharge line could be achieved by maintaining 22 f.p.s. through the pump discharging into an 18-in. line.

Such velocity is seldom practical because of the high rate of wear produced, but the combination of circumstances in British Guiana made it a natural choice for this particular job. An initial capital saving of 50 percent was obtained, as well as a saving in diesel fuel. The uniform mixture of the sand contributed to the use of a low pipeline velocity and Morris Flintmetal wearing parts were used, with resultant savings.

Both pumps have very heavy shaft and bearing construction to withstand the hard pounding of dredging duty. Pressure-balanced impellers are of heavy section, and the side discs are protected by heavy renewable liners. The correct hydraulic design results in a uniform wear pattern on all parts.

One of the monitors (lower left), a sand pump skid (top right), and a part of the pumping lines, which total more than a mile in length.

How to Use BREAK-EVEN CHARTS in Making Decisions

By SPENCER A. TUCKER, P.E.
Martin & Tucker, Management Consultants
Little Neck, N. Y.

REGARDLESS of the size of a company, major decisions must be made eventually. How these decisions are made fixes the ease of profit-making, the company's competing ability, and its chance of survival in a recession.

Break-even charts test in advance the effect of management's decisions. Then the business course can be charted, and the impact of certain moves and changes can be prejudged.

Break-even charts give the following information: impact of price reductions, effect of adding equipment, impact of increasing the staff, effect of change in the product or the product mix, and how and when to price marginally.

Basic Data To construct a B.-E. (break-even) chart, it is necessary to divide company expenses into two parts: variable and fixed. Variable costs are those which change with volume, *e.g.*, materials, direct labor, etc. Fixed costs are

EXHIBIT 1
Segregation of Fixed and Variable Expenses at $1,200,000 Sales Level

Expenses	Total Costs	Fixed or Variable Cost	Fixed Amount	Variable Amount
Direct materials	$350,000	variable	-	$350,000
Productive labor	200,000	variable	-	200,000
Mfg. overhead	250,000	both	$200,000	50,000
Administrative exp.	100,000	both	75,000	25,000
Selling expenses	100,000	both	45,000	55,000
Total expenses	$1,000,000		$320,000	$680,000

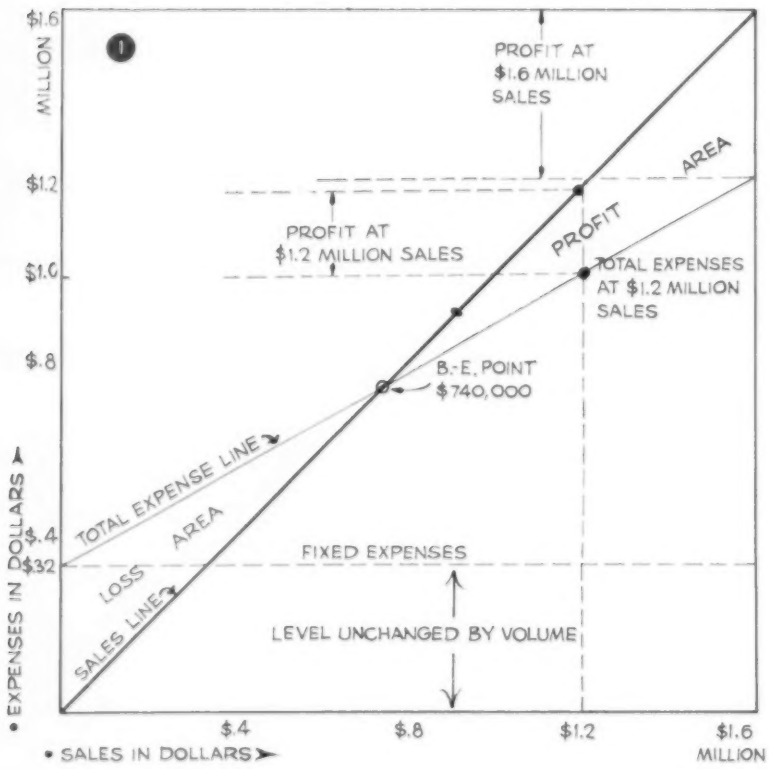


EXHIBIT 1
Conventional P & L

Sales	$1,200,000
Total mfg. cost	800,000
Sell. & admin. exp.	200,000
Total Exp.	$1,000,000
Net profit before taxes	$200,000

Break-Even P & L

Sales	$1,200,000
Total variable exp.	680,000
Total fixed expenses	320,000
Total exp.	$1,000,000
Net profit before taxes	$200,000

Break-even charts can test in advance the effect of management decisions regarding plant expansions, price reductions, staff increases; and they also indicate a firm's competitive position.

those which remain the same, *e.g.*, depreciation, rent, etc. Some expenses have portions of each, such as supervision. **Exhibit 1** shows both the conventional and the B.-E. method of stating expenses to find out the profit trend. The B.-E. method separates expenses into variable and fixed, and these two groups are used to construct the B.-E. chart shown.

Construction Of B-E Chart In the square of Exhibit 1, the diagonal is the sales line. The horizontal base line is the sales capacity, and the left vertical line is for expenses. The expense line is scaled in dollars, and the sales capacity line may be in dollars or in any other logical unit of output, such as tons, pieces, square footage, etc.

Using the data presented, the fixed expense line is dotted in as shown; its value remains the same for all sales levels. The total expense line is drawn from the minimum of $320,000 at zero sales to the maximum of $1,000,000 at maximum sales. The point at which this total expense line crosses the sales line is the break-even point. In this case it is $740,000, the point at which there are no profits or losses. When volume rises above $740,000, profits are made; when it falls below $740,000, losses are experienced.

Meaning of B.-E. Point When the B.-E. point rises, the company has to sell more to maintain its level of profit. Sometimes the rise makes the company vulnerable to price reductions. At times it imposes psychological pressures which lead to desperation pricing and poor judgment. It is best to test decisions in advance.

Adding equipment, more personnel, or shifting the product or product mix can raise the B.-E. point. This move may be good or bad, depending on the state of the company and how the move affects the fixed and variable expenses.

If the decision concerns adding equipment, the cost will raise fixed expenses and will make large profits in boom times. However, in periods of recession the company would be in a tight spot since it could not readily adjust its expenses to lowered income.

If the B.-E. point rises because of increasing a variable expense, the company will not make as much profit during boom times, but it will be on safer ground during recessions, since its expense pattern is much easier to change.

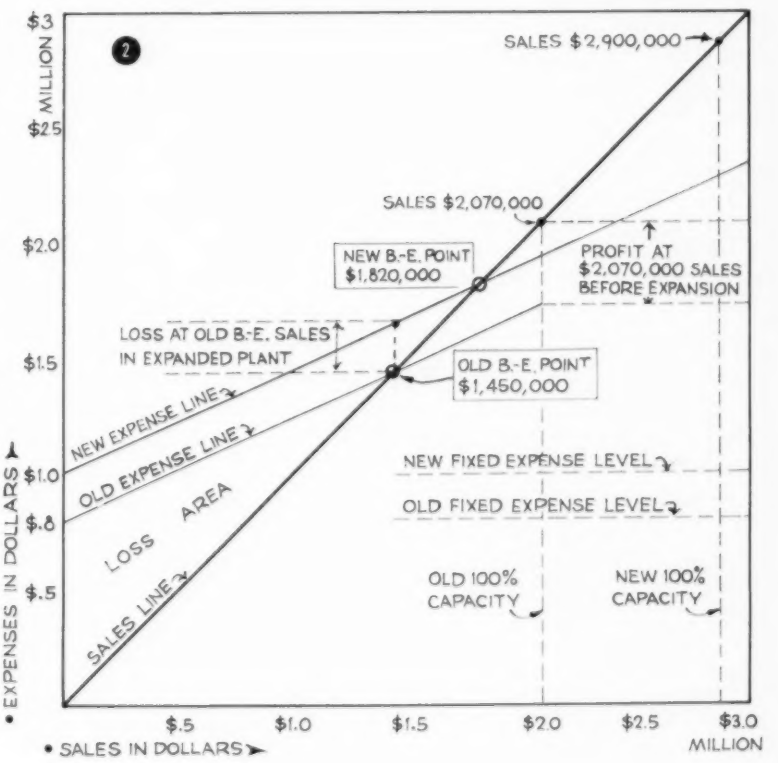
Impact of Additional Equipment Expansion based on today's volume and market is like building a house without a roof, on the assumption that it will never rain. The sun may be shining today, but it's only a matter of time before the clouds will appear.

Exhibit 2 shows the before and after B.-E. points of a company that wishes to expand its capacity by 40 percent. Its fixed costs are $800,000 and its variable costs $931,500 or 45 percent of sales. Its present maximum sales level is $2,070,000 and its B.-E. point is $1,450,000, as shown by the intersecting lines on the chart.

Getting 40 percent more capacity with present equipment would raise fixed expenses to $1,000,000—a 25 percent increase. The variable costs would still remain 45 percent of sales, which is now planned at $2,900,000. The new B.-E. point, as shown on the chart, would be $1,820,000—an increase of $370,000 over the old B.-E. point.

The profit at full capacity before the expansion was $350,000. With the load of the additional equipment, sales would have to be $2,460,000 (instead of $2,070,000) to make the same amount of profit. That means that there *must be an increase in sales of at least $390,000* to justify the proposed expansion.

What will happen if the company does not get the increases expected after committing itself to the expansion? Suppose sales do not go above the old maximum of $2,070,000? Then the profits will be only $138,-



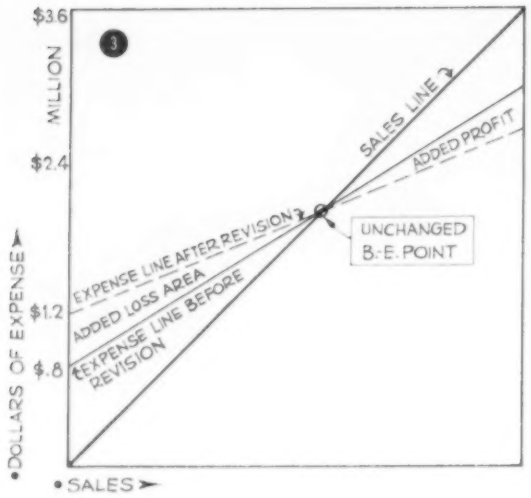
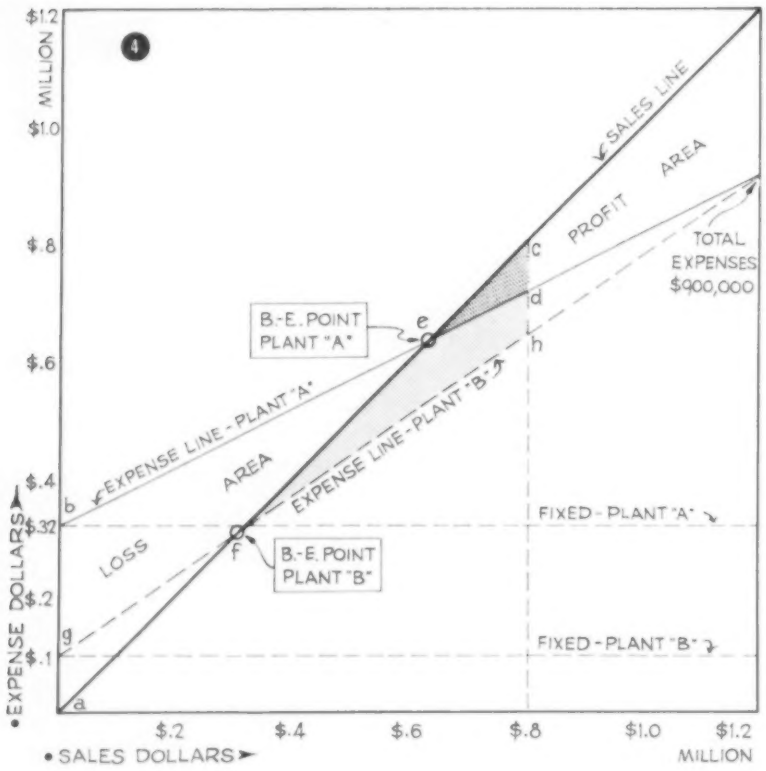


EXHIBIT 3

	Before	After
Fixed expenses	$ 800,000	$1,200,000
Variable exp.	1,800,000	1,200,000
Total Expenses	$2,600,000	$2,400,000

EXHIBIT 4

	Plant A	Plant B
Sales	$1,200,000	$1,200,000
Fixed expenses	320,000	100,000
Variable exp.	580,000	800,000
Total expenses	$ 900,000	$ 900,000



500—a *61 percent drop in profits* caused by a *16 percent drop in sales*. This is an example of loss vulnerability.

Obviously, if sales dipped slightly more, a loss would be experienced.

Like so many companies which boosted the level of their fixed expenses by retaining permanent departments, doing more "make" than "buy," indulging in unjustified "front" expenses, and failing to police creeping losses, this company acquired a rigid fixed-expense pattern which now requires major surgery for removal.

Some expansions are made without a change in the B.-E. point. **Exhibit 3** shows the data of a company before and after its expansion. Notice that while the fixed expenses rose 50 percent as a result of the increase, this was offset by a one-third reduction in the variable expenses.

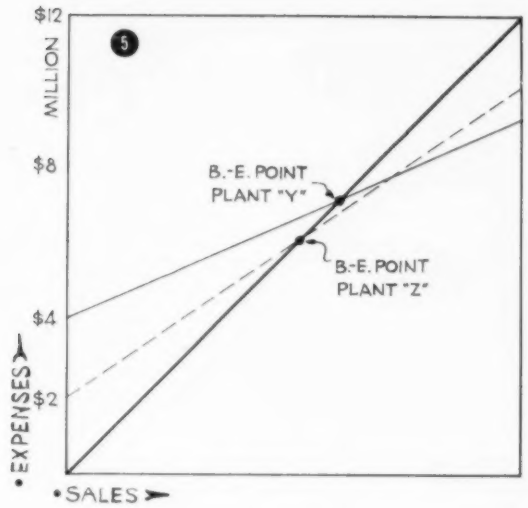
As long as the company believes that its normal sales volume will not fall below its B.-E., which remains unchanged, all volume over this point produces a greater profit than the company enjoyed before the expansion.

Competitive Strength The B.-E. chart also shows the ability to cope with competition. **Exhibit 4** shows the data of two companies in exactly the same industry, making the same profit at maximum capacity. However, because of their different internal economies, their earnings are considerably different below this peak level.

Company A bought additional equipment as a panacea for higher profits, had excessive administrative expenses, and obtained low productivity in their manufacturing or processing. Company B used older equipment but squeezed every last cent out of them, farmed out some of the production work, and had a tight control on methods and costs.

Company B's B.-E. point was $300,000; Company A's, $618,000. When sales volume was at $300,000, Company B was not gaining or losing, but Company A was losing $320,000 in *profits*. To survive in recessions, Company A would have to sell off equipment, eliminate administrative activities, improve operations—all almost immediately. Company B would not have to worry

EXHIBIT 5	Plant Y	Plant Z
Sales	$12,000,000	$12,000,000
Fixed expenses	4,000,000	2,000,000
Variable exp.	5,000,000	8,000,000
Total expenses	$ 9,000,000	$10,000,000
Net profit before taxes	$ 3,000,000	$ 2,000,000
Vulnerability		
Profit at $7.2 million	$ 200,000	$ 400,000
Profit at $4.8 million=Loss:	($1,200,000)	Loss: ($400,000)



about these impractical moves since the larger portion of their expenses is variable and easily adjusted to volume dips.

Look at the differences in vulnerability; the balancing between risk and gain. At $800,000 in sales, Company A's gain wedge is shown in the dotted area *d-e-c*, of the chart obtained at the risk of *a-e-b*.

Company B has a more sensible operation. It gains the zone *h-f-c* by risking wedge *a-f-g*. Obviously, Company A gains over the $1,200,000 sales level only.

A proportioning between the fixed and variable cost elements is necessary in planning for the longer term. A lower total expense does not necessarily protect a company against pitfalls.

Exhibit 5 shows the data for two companies. The one having a *higher* total expense also has the *lower* B.-E. point. This is possible only because of the impact that the fixed costs has in each company.

Both companies are in the same industry and make a similar line of products. However, Company Y has fewer manual operations than Company Z. While Z uses and pays more labor per unit, it keeps itself more elastic since it doesn't have large investments in equipment like Y. Company Z uses production wage incentives instead for boosting its output.

Conclusion Expansions, price reductions, changes in staffing, etc., are all fine if they can be economically justified. The company that makes one of these moves without first testing its effect is taking an exercise in chance. By using properly classified data and breakeven charts, management gets some idea of the company's characteristics. Then a safe and profitable growth path can be planned.

S. W. Portland Cement Plant Hits 1,000-Day Safety Mark

Employees of the Southwestern Portland Cement Company's plant at El Paso, Tex., established a safety goal on April 23 when they had operated for 1,000 days without a lost-time accident. Three of the firm's operating departments have safety records exceeding 30 years.

Southwestern has received awards from the Texas Safety Association and the Portland Cement Association, and is eligible for another from the National Safety Council.

GLENN E. WILSON has been named supervisor of production at Bestwall Gypsum Company's Fort Dodge, Iowa, plant. Mr. Wilson, who also is production manager at Bestwall's Akron, N. Y., Grand Rapids, Mich., and Pryor, Okla., plants, takes on supervision of the Fort Dodge production as an additional responsibility.

CRAIG D. LEIBSLE has been appointed assistant to the manager of the Southwest Division of Southwestern Portland Cement Company. This Division includes plants, sales, and administrative offices at El Paso and Odessa, Tex. Mr. Leibsle has been with the firm since 1953; he most recently was project manager of the Los Angeles office.

N. Y. Trap Rock Co. Crusher Has Impressive 50-Yr. Record

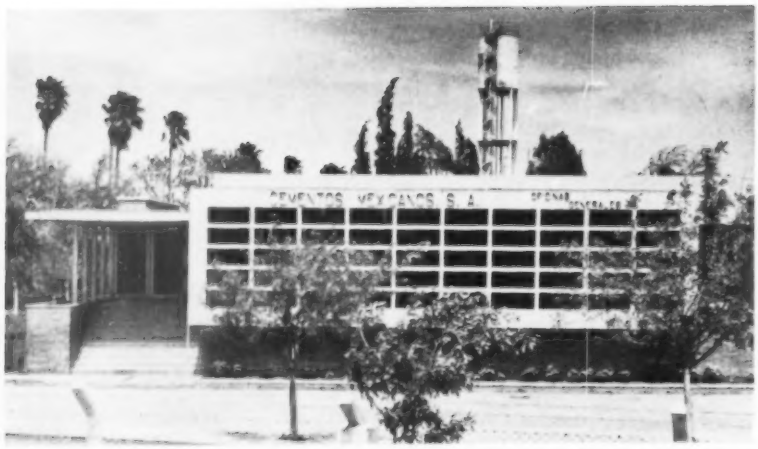
Records kept at the Clinton Point, N. Y., plant of New York Trap Rock Corporation revealed that the primary crusher at this installation has been in continuous service for 50 years. During that period the unit crushed about 55,0000,000 tons of stone.

Interested staff statisticians figured out that this volume of material, if stored in barges end to end in a single line, would fill enough vessels to extend 200 miles.

E. J. LANG has been appointed vice-president in charge of the calcium division of Linwood Stone Products Co., Davenport, Iowa.

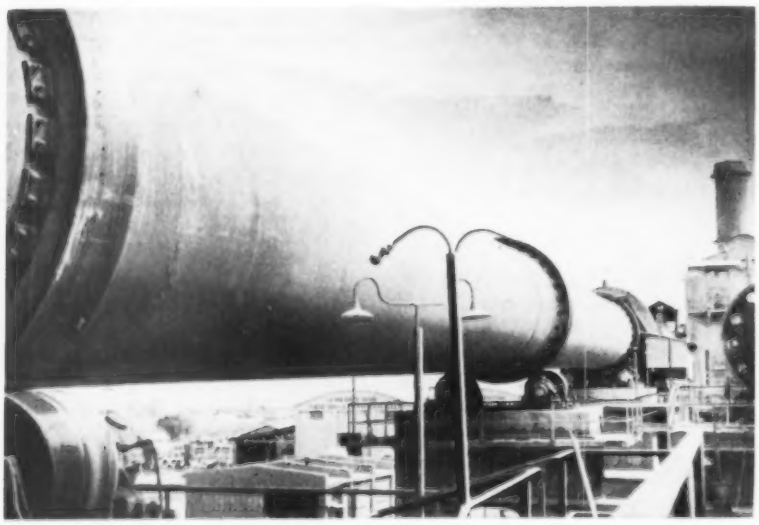
Cementos Mexicanos

By **RODOLFO F. BARRERA**
Assistant Manager
Cementos Mexicanos, S.A.



The handsome modern concrete office building of Cementos Mexicanos, S. A.

Below: The new 11-ft. 6-in. by 400-ft. rotary kiln, viewed from the discharge end. The older 175-ft. kiln is at the right.



ANOTHER P&D EXCLUSIVE

CEMENT production in Mexico is keeping step with the country's expanding economy and great strides toward industrialization. At the end of World War II the production barely reached 5,000,000 bbl. per year; the output last year was 16,000,000 bbl. for the 20 cement plants which were operating at the end of 1959. This means that Mexico is now self-supporting as far as cement is concerned and is even exporting a small amount of cement to Central American countries; some white cement is also shipped to the United States.

Cementos Mexicanos, S. A., with its plant and executive offices located in the outskirts of Monterrey, State of Nuevo Leon, was the first plant to produce both white and gray portland cement in Mexico, and it is now the largest producer in northern Mexico. The Monterrey plant, built in 1920, was gradually enlarged, until in 1957 it reached a potential annual capacity of 1,500,000 bbl., with four rotary kilns.

After careful studies of the growing market in the region served by this plant, it was decided to increase the capacity by 1,000,000 bbl. to a total yearly production of 2,500,000 bbl. The machinery for this extension was ordered in 1957 and placed in operation during 1959. The following description covers the principal units of the expanded plant, including a large new building for raw-material handling and grinding, and a reinforced concrete structure equipped with a P & H. overhead travelling crane.

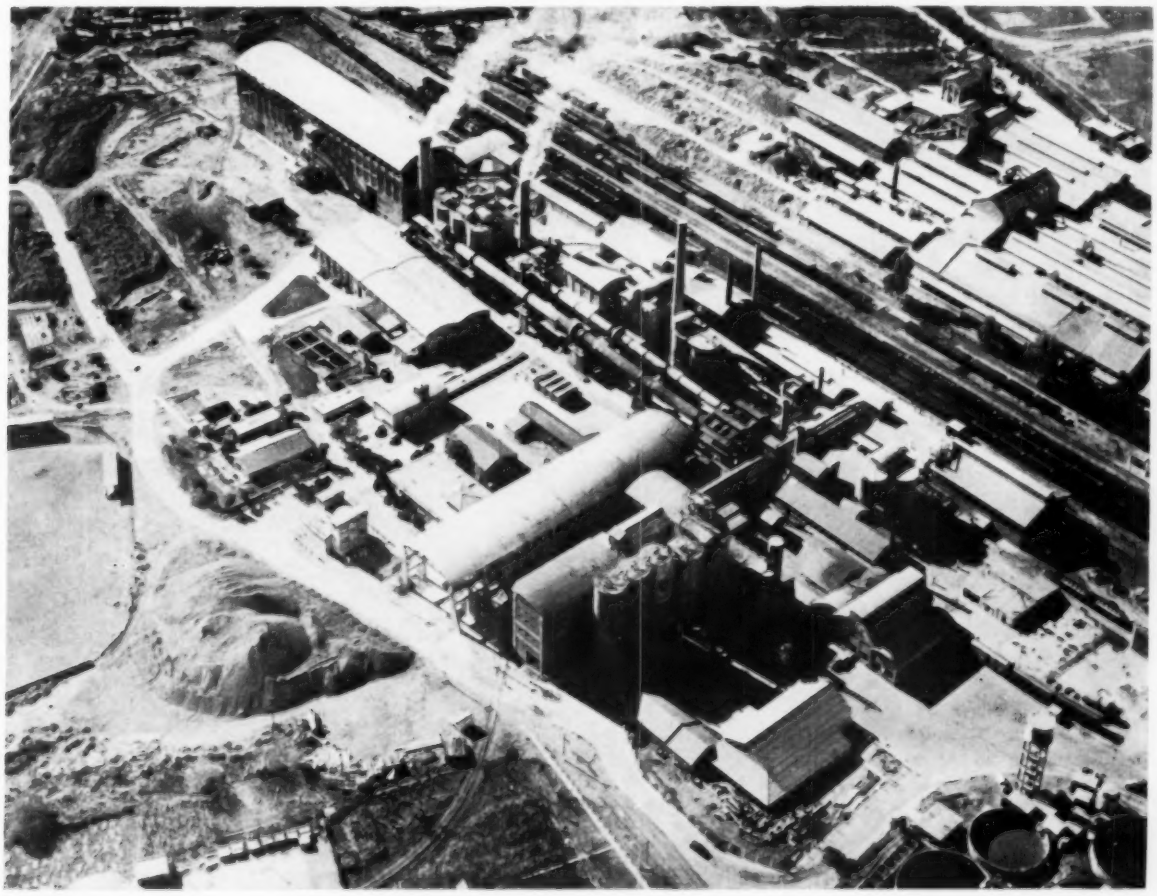
Expands Facilities for Manufacture Of White and Gray Portland Cement

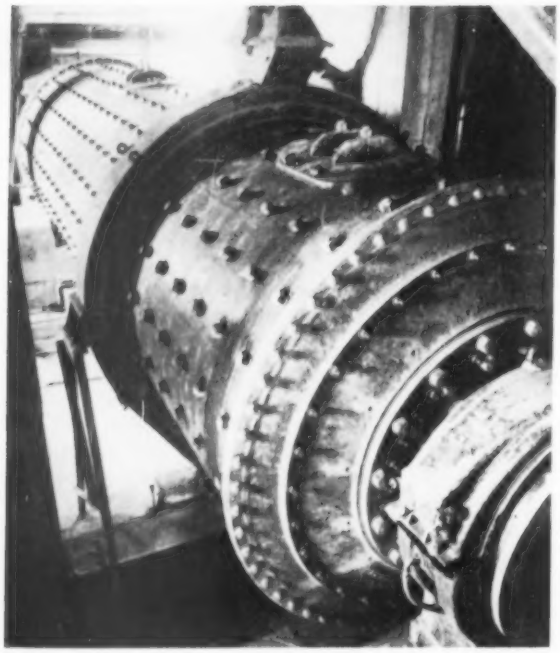
capacity increased from 1,000,000 to 2,500,000 bbl. per year

Raw Material Handling and Grinding Raw materials consist of pure limestone and argillaceous calcareous conglomerate. The conglomerate is crushed in the existing crushing department and is discharged into one compartment of the storage. From this compartment the crane feeds a hopper over a Hardinge dryer equipped with a Norblo dust collector.

The dried rock is discharged into a second compartment of the building, from which it is taken by the overhead crane to one of the feed hoppers over a 4-ft. Symons cone crusher. The latter unit is in closed circuit with a rod-deck vibrating screen. The limestone, which does not need drying, is fed by means of a Jeffrey vibrating feeder to a Williams hammermill, and discharged into another compartment of the rock storage. From storage it is taken by the overhead crane to a

In this aerial view of the Cementos Mexicanos plant near Monterrey the new storage, crushing, and drying installations and the new kiln are at the top, left. At the far right are the white cement slurry silos, the clinker storage, the grinding and packing departments, and the storage silos. To the right of these is the school, and at the far left is the baseball diamond.





The 9-ft. 6-in. by 32-ft. 6-in. two-compartment raw-grinding mill, with peripheral discharge. It is fed through both trunnions.

second hopper of the Symons crusher.

The product discharged from the crusher and screen, which is under ⅜ in., goes to two mill hoppers. From these the materials are fed into the raw mill by means of two Hardinge constant-weight feeders, which are controlled from the laboratory.

The raw mill is a Smidth two-compartment Unidan mill 9 ft. 6 in. in diameter by 32 ft. 6 in. long. The mill is of a special design conforming with the requirements of Cementos Mexicanos. It is arranged for feed through both trunnions and has peripheral discharge as shown on the accompanying illustration. The mill is the largest unit ever built of this design and it has been used successfully by Cementos Mexicanos for many years.

The first mill compartment, 8 ft. long, works in closed circuit with a Hum-mer screen. The plus 12-mesh fraction is conveyed to two 16-ft. Sturtevant separators which are closed circuited with the second (23-ft.) mill compartment. The total grinding charge is 165,000 lb., and the mill speed is 19.3 r.p.m. The mill is designed for an output of 58 t.p.h. ground to 92 percent through 200-mesh.

The mill is driven through a Smidth special Symetro drive TS-1250, with 720/19.3 r.p.m. reduction. A membrane coupling connects to the mill trunnions. A 1,250 hp. Westinghouse synchronous motor (720 r.p.m.) is coupled to the high-speed shaft of the Symetro through a Stearns magnetic clutch to reduce current inrush when the mill is started.

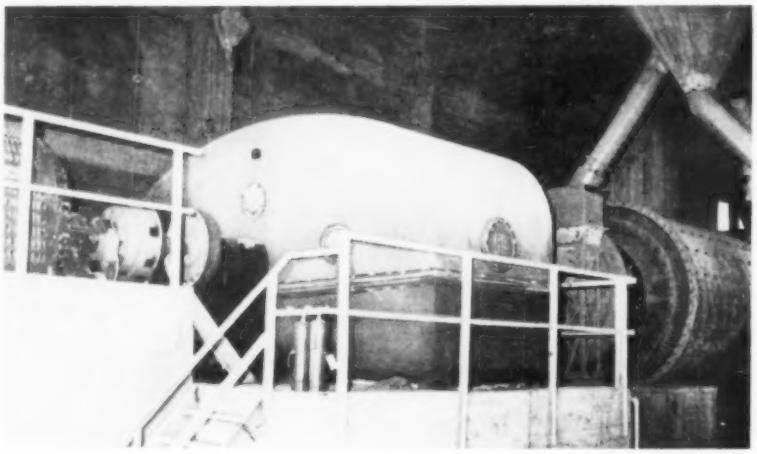
Burning Burning takes place in an 11-ft. 6-in. by 400-ft. Smidth rotary kiln, the largest installed in Mexico. The unit, riding on five supports, is of the all-welded type, with bolted-on supporting blocks under the tires. It is designed for a nominal capacity of 3,000 bbl. but is producing up to 3,300 bbl. without excessively forced operation. The kiln is gas-fired.

Raw mix is fed to the kiln through a variable-speed screw which extracts the material from a constant-level bin. A Buell cyclone collector handles dust removal, and the cleaned exit gases are discharged to the stack through a 175,000 c.f.m. induced-draft fan. The kiln is driven by a 150 hp. variable-speed unit through a speed reducer coupled to the master pinion and conventional spur gear. A gasoline engine is provided for turning the kiln in case of power failure or any other emergency.

Clinker is discharged into a 7- by 41-ft. Fuller horizontal grate cooler with a breaker at the discharge end. Kiln controls, including flow meter and recording instruments for natural gas, are mounted on a control panel at the burner platform.

Finish Grinding Finish grinding of the crushed clinker takes place in a two-compartment Smidth Unidan mill with peripheral discharge. This is a 9-ft. 6-in. by 32-ft. 6-in. mill of a design identical with the raw mill described above. A unique feature is the Smidth internal water spray cooling

The 9-ft. 6-in. by 32-ft. 6-in. two-compartment finish mill, with its motor, drive, and separator.



system, which enables the mill operator to control and maintain low and uniform temperature of the cement. Clinker and gypsum are fed into the mill by means of Hardinge constant-weight feeders.

The mill operates in closed circuit with a 16-ft. Sturtevant separator, and a Norblo dust collector keeps the system dust-free and clean. The mill is driven through a Smidth Symetro gear unit drive by a 1,250 hp. Westinghouse synchronous motor. It is producing 160 bbl./hour of portland cement.

White Cement Production Concurrently with the installation of machinery for increasing the production of portland cement, Cementos Mexicanos embarked on a program to augment and improve the manufacture of white cement.

White cement has been produced for a number of years by the intermittent use of one of the originally installed small rotary kilns at Cementos Mexicanos, but it was decided to rationalize the production by assigning the existing kiln (No. 3), a 10-by 175-ft. rotary kiln, exclusively to the manufacture of white clinker.

Raw materials for white cement are limestone of exceptional purity, containing only 0.04 percent iron oxide, and kaolin with 0.11 percent iron oxide. The materials are ground to a fineness of 92 percent 200-mesh, and special care is taken to avoid contamination from iron. Uniform composition of the raw meal is achieved in homogenizing silos with a Fuller blending system.

The kiln is equipped with the patented Smidth burner system for white cement kilns by which the small impurities in the clinker are converted into a colorless form, resulting in maximum whiteness. A Fuller inclined-grate cooler discharges the clinker into an enclosed storage room. Finish grinding takes place in two mills charged with special alloy grinding media. A fineness of over 3,500 Blaine is obtained.

Due to the excellent quality of the raw materials, the efficient homogenizing, and the special Smidth system for burning white clinker, the white cement is of a high degree of whiteness and compares favorably with any brands on the market. The cement is marketed under the name "Monterrey White." A typical analysis of the white cement is as follows:

SiO_2	—	21.8%
Al_2O_3	—	4.8%
Fe_2O_3	—	0.18%
CaO	—	68.6%
MgO	—	0.45%
MnO	—	0.009%
SO_3	—	2.27%
Ign. loss	—	1.48%

Cementos del Norte Adjacent to the cement plant are the installations of an affiliated company, Cementos del Norte, S. A., which produces blast furnace slag portland cement from clinker supplied by Cementos Mexicanos and granulated slag from the blast furnace mill in Monterrey; it also produces slag cement. The yearly output is 420,000 bbl. of cement, which is mainly consumed in hydroelectric works and dam construction.

Officials Jesus Barrera, chairman of the board and general manager of Cementos Mexicanos, has been identified with the Mexican cement industry for 51 years, and is presently serving as president of the Mexican Portland Cement Association.

John C. Seelig, who started out as plant engineer 40 years ago in the first cement plant in what is today Indonesia, is general superintendent. Armando J. Garcia and Ing. Rodolfo F. Barrera are assistant managers. Juan Yunes is in charge of production and chemical control.

The affiliated Cementos del Norte is under the management of Ing. Edgardo Quiroga.

Two Concerns Acquired By S. Pacific Milling Co.

Southern Pacific Milling Company, which has its headquarters in Ventura, Calif., has acquired two additional production operations. The firm has purchased Saugus Rock and Sand Company of Saugus, Calif., and Industrial Concrete of Van Nuys, Calif., from Industrial Asphalt of California, Inc.

The new acquisitions will serve to extend Southern Pacific Milling's aggregate operations into Los Angeles County, bringing the total number of its production locations to 15. This closely follows the addition of an asphalt mixing plant near Lompoc, Calif.

Saugus Rock and Sand is a principal aggregate producer, serving the northwestern section of Los Angeles County. Industrial Concrete has modern concrete batching facilities serving the San Francisco Valley.

Southern Pacific Milling is a division of United Industrial Corporation.

The Colonial Sand and Stone Company, New York, N. Y., will move its North River building materials plant to make way for the projected third pier of the Cunard Line. Colonial will move its 50-year-old plant from the W. Fifty-Fourth St. plant to a waterfront site just north of West Fifty-Ninth St.

● Braswell Industries, Shreveport, La., has taken delivery of 20 heavy-duty International tractors (such as the unit pictured here) at a cost of approximately $250,000. The model R-225 includes an RD-501 engine rated at 212 hp., five-speed transmission, trailing axle with V-belt drive, and a sliding fifth wheel. Southern Cement Transport, a Braswell subsidiary, will use the new tractors to haul bulk and bagged cement cargoes to users in Texas, Arkansas, Oklahoma, Louisiana, and Mississippi.

Sand and Gravel Plant Built To Dual-Purpose Design

Standardization + Flexibility = Efficient Production

ONE of the most interestingly engineered sand-and-gravel plants in northeastern Texas was built and placed in operation by Wesco Materials Corporation about 20 miles southeast of Dallas. Known as the Van plant, it is the newest of three Wesco sand-and-gravel production facilities in the Dallas area, and is rated at 275 cu. yd. per hour.

The primary features in its efficient layout and processing design have their origin in seemingly unrelated factors. On the one hand, the plant is comprised of standardized units or sections, an arrangement which not only provides ease of erection or dismantling, but allows integration of one or more units with any other of Wesco's plants. (The full operation can be dismantled and reset within two months.) On the other hand, these standardized units have been arranged in a flow line that will effectively handle the problem presented by material variation and gradation in the available deposit.

Specifically, the Van plant was built when construction of Interstate 45 (U. S. 75) started south from the Dallas County line. Materials have been supplied for more than 15 miles of that project, including access roads, the Ennis by-pass, and hot mix aggregates for shoulder construction. Of all sales, about one-fourth is utilized in ready mixed concrete applications and another fourth in bituminous concrete; the rest is consigned to contractors and municipal agencies.

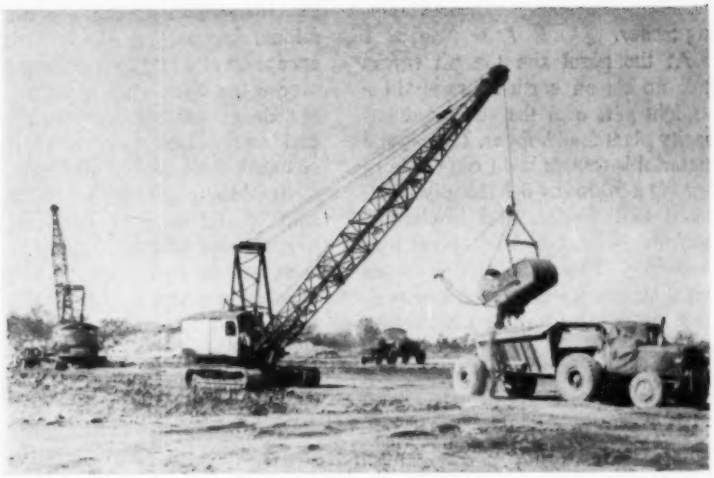
A predecessor operation, since dismantled, was situated a short distance north of the present facility, and was a major source of material for construction of that section of Interstate 45 between the city of Dallas and the Dallas County line. When the deposit and that construction project were respectively depleted and completed at about the same time, the present site was selected for advantageous proximity to both commercial markets and the highway extension.

One of the four 15-cu. yd. (struck) bottom-dump trucks discharging a load of pit run material into the plant feed hopper.

However, the physical characteristics of the deposit in this 50-acre leased tract dictated operating and plant design that would permit close cost control and the most efficient handling of the smaller size range of the pit-run material. These factors are emphasized by the facts that from 14 to 19 ft. of overburden must be stripped from a gravel deposit that varies between 1½ and 6 ft. in thickness, and contains about 60 percent of minus ⅜-in. material.

While overburden is handled by a well organized excavating schedule on a round-the-clock basis, gravel recovery led to the incorporation of

From 14 to 19 ft. of overburden must be stripped from the deposit. On the day shift one of the two draglines loads while the other strips; both are assigned to stripping on the night shift.



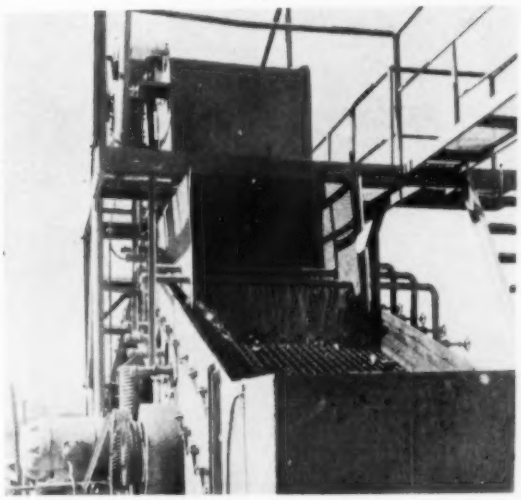
By BUREN C. HEROD

some unusual processing features and equipment installations. This system involves a de-sanding phase as the very first plant operation, followed by completely separate processing lines for gravel and sand, and a unique handling and stockpiling system for the latter.

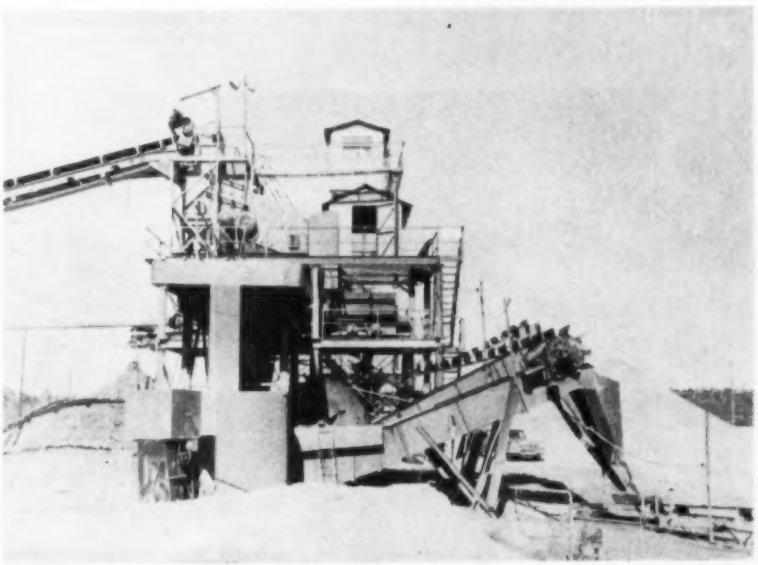
The plant proper, as indicated previously, is constructed of standard components including such items as structural sections, control rooms, switch gear, etc. For erection (or dismantling for relocation) these components are handled as complete individual units. One of the accompanying plant views shows the control room, and an underlying switchgear shack and tool room; these are typical examples.

Pit operations involve a pair of 3-cu. yd. Northwest 95 excavators rigged as draglines and equipped with Hendrix perforated buckets, and four bottom-dump Euclid haulage units with 15-cu. yd. struck capacities. Both draglines are assigned to overburden stripping on the night shift; during the day one loads while the other strips.

Maintenance of this equipment in the field, at regular intervals, is aided by the use of a grease truck fitted with Alemite lubricating equipment and a compressor, and supplied with Texaco lubricants. Also



The first major step in the flow. In order to get maximum suspension of sand in the feed onto this de-sanding screen, about 100 g.p.m. of water is added to the feed box, top center.



Standardized plant units are used by Wesco to facilitate erection, dismantling, or incorporation with any other of the firm's operations. For example, the control room (top) and switchgear shack (immediately below) may be removed as complete sections.

available is a 500-gal. diesel refueling trailer.

At the plant site the pit trucks pull up on an earth-fill ramp in a straight pass over the 40-cu. yd. capacity plant feed hopper. The pit-run material is transferred from the hopper *via* a 30-in. by 8-ft. locally fabricated belt feeder, and discharged onto the 30-in. by 119-ft. plant feed conveyor. This conveyor is fitted with Hewitt-Robins idler components and belting, as are most others in the operation.

The feed is received at the top of the plant on a 5- by 14-ft. triple-deck Hewitt-Robins Vibrex screen, which accomplishes the first major step in the flow—de-sanding. This type of screen was specified in the design due to its parallelogram cross section, which results in a longer effective screening surface on the middle and bottom decks. With the exception of a narrow retaining plate across the back end of each deck, the decks are open at both ends, and screencloth may therefore be changed from either direction.

In order to get maximum suspension of the sand in the feed delivered onto this de-sanding screen —as well as to accomplish a more even distribution of the pit run material as it is delivered to the top deck—about 100 g.p.m. of water is added to the feed conveyor discharge in a feed box preceding the screen. This water is augmented by that from spray bars mounted on both the upper and middle decks.

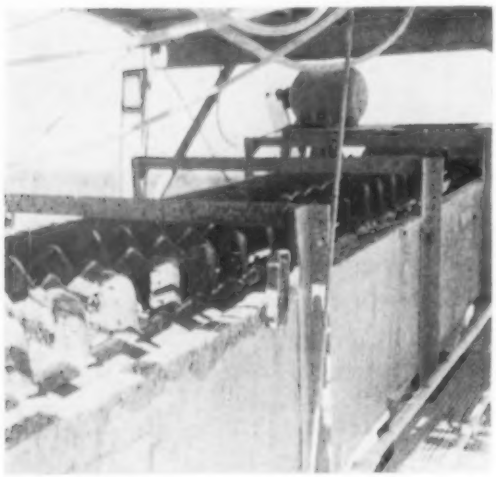
In routine operations the top deck of the de-sander is fitted with cloth of 1⅞-in. square openings, on which a nominal amount of oversize is rejected. This material is transferred on a short conveyor to an oversize material pile. A ⅜- or ⅝-in. opening surface may be used on the middle deck, and the bottom deck is fitted with ⅛- by 2-in. slotted screencloth.

Material retained on the bottom deck is chuted to a conveyor leading to the final screen tower. That retained on the middle deck may also be chuted *via* flopgate to the above conveyor, but in normal practice it is chuted to a 7- by 30-ft. Eagle Iron Works double log washer. After this cleaning it is discharged to the final screen feed belt.

Sand and wash water passing the bottom deck of the de-sander are flumed into an adjoining 8- by 32-ft. scalping tank. This tank, a company fabricated unit, has nine discharge ports equipped with spring-loaded valves.

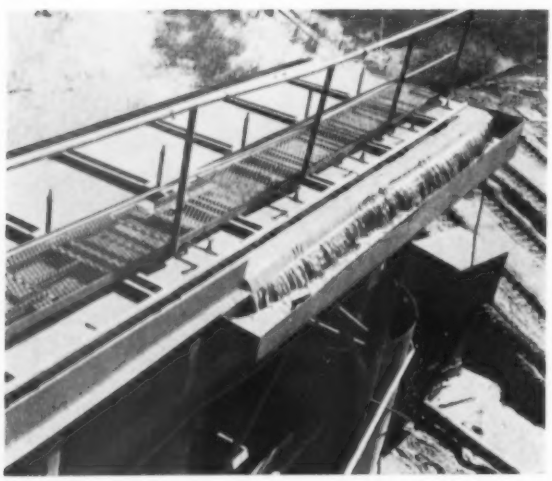
Overflow from the scalping tank is transferred by an 8-in. Amsco pump to a settling pond. From the latter, water filters into a fresh water pond nearby, from which it is returned to the plant site by an 8X10 Fairbanks-Morse centrifugal pump.

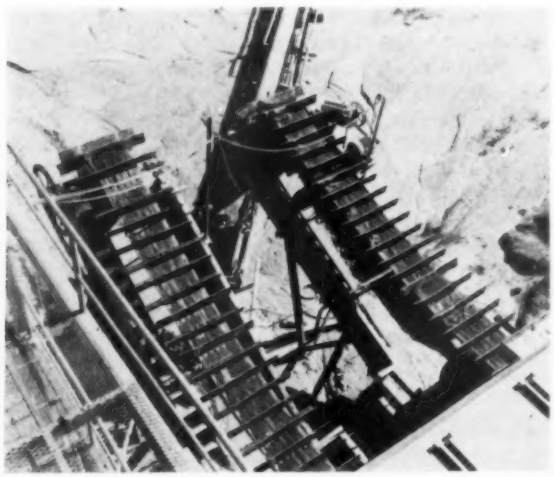
The scalping tank underflow discharges into either or both of a pair of sand drags. Also fabricated in the company shops, these 4- by 25-ft. units, as seen in an accompanying photograph, have steel flights bolted



Left: Middle-deck fractions from the de-sander are normally chuted to this 7- by 30-ft. double log washer. Discharge from the latter is delivered to the final screen feed belt.

Below, left: Sand and wash water from the de-sanding screen flow to this 32-ft. scalping tank. Overflow is pumped to a settling pond, and underflow passes to a pair of sand drags.





These 4- by 25-ft. sand drags have steel flights bolted to rubber belting. Combined, the drags handle 150 cu. yd. of sand per hour.

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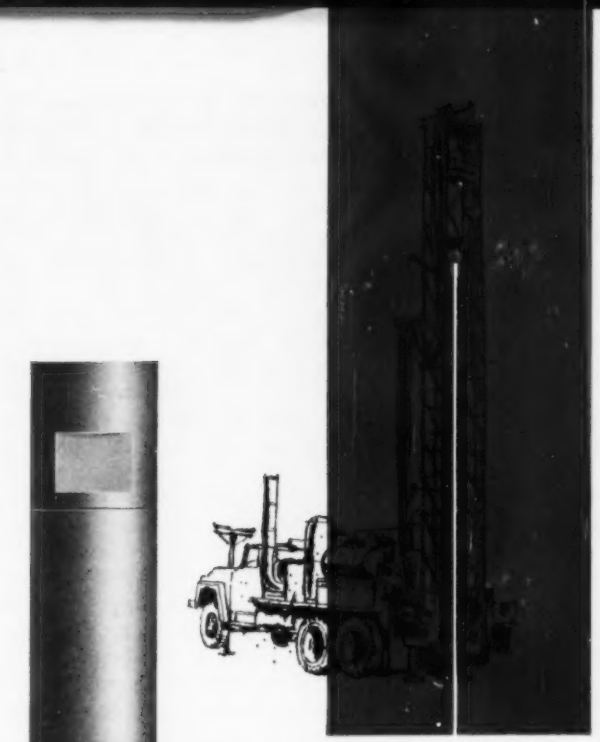

straight line to drilling profits

MISSION HAMMERDRIL A straight line, even in crooked hole country, means faster drilling. This bottom hole impact tool is not subject to hole deviation as other methods of drilling are. Straighter drilling and faster drilling mean more jobs and a bigger chance of success.

The fewer parts that move, the less chance for trouble. There are only two moving parts in the high pressure Hammerdril® and only three in the low pressure. Impact parts are heat-treated high alloy steel; moving parts are friction and wear resistant.

You can begin now to use the Mission Hammerdril on your present rotary rig simply by adding suitable air compressor capacity. You can begin now to cut the cost per foot of drilling through hard rock and still do that drilling better. And best, you can **re-sharpen** the massive tungsten carbide inserts in the Hammerbit® **in the field.** These inserts give maximum cutting efficiency and straight, full gauge hole.

The Mission Hammerdril is sold and serviced throughout the United States. Write for actual field savings under field conditions being realized by present Hammerdril users.

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60—100

to rubber belting. Combined, the drags handle 150 cu. yd. of sand per hour. Overflow from the drags is delivered to a 4-in. K. C. Haypress pump, and returned to the scalping tank.

An efficient and rather unusual material-handling system was installed for transfer of sand from the drags to stockpile. This setup involves a 24-in. by 700-ft. long horizontal conveyor at ground level, equipped with a Continental Conveyor and Equipment Co. tripper and a 24-in. by 120-ft. rail-mounted stacker.

The ground level conveyor is paralleled on each side by a concrete pad on which a single rail for stacker travel is installed. If in the future it becomes necessary or convenient, the stacker may be moved to the opposite side of the tripper conveyor from that seen in an accompanying photo. A winch is employed in moving the stacker along the stockpile area, with the winching cable attached to a rail anchor clip. The discharge end of the stacker is 36 ft. above rail level.

In completion of the processing flow, the discharge from the log washer and the lower deck of the de-sander described previously is transported on a 24-in. by 239-ft. inclined conveyor to the finishing screen. This unit, identical with the de-sander, is mounted above a set of three 55- cu. yd. capacity tanks. One of these is divided into two compartments, and thus four load-out bins are available.

Left: The finishing screen, a unit identical to the de-sander, is mounted above a set of four loading bins.

Below: The design of this efficient stockpiling system stemmed from the need for handling a substantial percentage of sand fractions. The stacker unit will ultimately be swung around to the right to create another lineal stockpile when necessary or convenient.

The upper and middle decks of the finishing screen, respectively, are fitted with ¾- and ⅜-in. square opening screencloth. For dewatering purposes, the first 10½ ft. of the bottom deck is fitted with ⅛-in. opening cloth, and the remaining 3½ ft. with 5/16-in. square opening material.

Individual fractions may be chuted to appropriate tanks, or, in the case of material retained on the upper two decks, they may be blended *via* flopgates with the discharge from the succeeding lower deck. Very little material passes the bottom deck; this is blended with the middle deck fraction to make a specification bituminous concrete aggregate.

Rinse water from the above finishing screen flows by gravity through a pipe mounted on the feed conveyor framework back to the de-sander screen structure. Here it is joined by overflow from the log washer and is returned by a 4-in. K. C. Haypress pump to the de-sanding screen feed box.

Stockpiles of gravel trucked from the load-out bins and those of sand discharged from the stacker are rehandled for truck shipment by a pair of clamshell cranes. Recasting of sand piles to accommodate continuing stacker discharge is handled by a dragline. Contract haulage is utilized for all shipments, and trucks are weighed out over a 50-ton Murphy scale.

As noted earlier, the primary water supply for the plant is furnished by an 8x10 pump drawing from the fresh water pond. This flow is boosted in pressure from 40 to 90 p.s.i. by a 6x8 Fairbanks-Morse pump for distribution to all pertinent phases. One other pumping installation is provided in the operation; a 6-in. Marlow pump, driven by a D318 Caterpillar engine, is used for pit dewatering.

All processing in the Van plant is handled by a crew of three men. Actually only one man is required to run the operation, since all production phases are regulated through an interlocked system from a central

Regularly scheduled field maintenance of draglines, pumps, and other pit units involves this truck-mounted lubrication equipment.

Jack Thomas, production manager, stands beside a sign indicating the number of consecutive accident-free days between first operations and the writer's visit. The record now has been extended; it is indicative of the concentration on safety shown by Wesco.

control console at the top of the de-sander structure. The second man is stationed at the plant feed hopper, and the third at the load-out bins. In addition to these, the crew includes the following: six dragline operators; four pit truck drivers; two tractor and dozer operators; three maintenance men (including a mechanic, a welder, and a grease truck driver); a dispatcher (who also handles screen analyses); and a cleanup man, who doubles as night watchman.

Evidence of foresight on the part of Wesco management—headed by W. W. Pickens, president—is found not only in efficient engineering and production, but in the firm's dedication to safety and fostering of safety consciousness among its personnel. At the time of the writer's visit, the plant had operated over 460 consecutive days (since it was placed in production) without a lost-time accident.

This is an important factor in the company's over-all record, which for the first 11 months of 1959 showed an accident frequency rate of 13.9—a substantial improvement over the same period of 1958, when the rate was 21.3, and an even more striking comparison with the national average of 32.6.

The progressiveness of this organization in all phases of labor-management relations, as well as safety, plus its proved production efficiency, is reflected in its steady growth. Operations of Wesco Materials Corporation and its more than 30 wholly-owned subsidiaries are in production in an area stretching from New Mexico in the Southwest to Florida in the Southeast.

Steady Expansion, Improvements Keynote of Calif. S-G Firm

Operations of Consolidated Rock Products Company, Los Angeles, are reported to have resulted in record sales and profits in the year just past as this concern continues to expand its activities.

During the year the company acquired all of the outstanding interest in Saticoy Rock Company, of Saticoy, Calif., an affiliate in which Consolidated has held an interest of approximately 51 percent for many years. The Saticoy properties include a modern sand-and-gravel plant, complete with heavy-media separation facilities, and concrete batching and asphalt-materials producing plants. Batch plants in Ojai and Thousand Oaks were also included in the deal.

In addition to the Saticoy acquisition, which cost $510,000, Consolidated spent $1,540,000 for additional property and improvements to plants and equipment. This sum was divided as follows: $580,000 for improvements to producing plants and a new machine shop; $650,000 for improvements to yards and batch plants; and $310,000 for trucks and truck-mixers. Negotiations are now in progress for the purchase of additional sand-and-gravel deposits in Orange County at a cost of approximately $950,000.

Consolidated now has a total of 902 employees, 214 of whom are salaried and 688 are hourly workers.

Volume of business in the first quarter of 1960 was lower than the January-March period of 1959, but business prospects for the remainder of the year reportedly are highly encouraging.

FRANK J. BARRETT, 70, former district manager of the Portland Cement Association in Seattle, Wash., died recently at his home. He was associated with the Washington-Portland Cement Company from 1917 to 1954, when he retired.

SANFORD RATCLIFF BROOKS, 73, retired general manager of Ideal Cement Company, died recently in a hospital in Little Rock, Ark.

More proof that...

AMSCO HELPS YOU MOVE MORE TONS PER DOLLAR

How a large contractor and a crusher manufacturer have cut downtime and increased service life with AMSCO equipment

AT MT. VERNON CONTRACTING CORP.

DAILY "TOOTH REPAIR" ELIMINATED BY SWITCHING TO AMSCO 2-PART TEETH

Mount Vernon Contracting Corp. is a large general contractor doing work throughout the middle Atlantic states. Its present contract is for road construction on the Cross Westchester Expressway, linking the New York State and New England Thruways.

The firm's four power shovels and two backhoes on this job are equipped with Amsco dippers or dipper parts and Amsco Simplex* 2-Part Teeth. Reason: competitive teeth previously used required daily welding build-up to maintain their points. Now, since switching to the Amsco Simplex, teeth are changed only about once a week. And change-over is *only a 5-minute job!*

With shovels operating 8 hours a day, 5 days a week, this is a mighty important advantage for Mt. Vernon. No wonder they say—"These Simplex teeth really stand up in service, especially in rock, and save us a lot of downtime."

*Patent No. 2,904,908

AT HIGHWAY MACHINERY COMPANY

AMSCO CRUSHER ROLLS HANDLE 50,000 YDS. BETWEEN BUILD-UPS

Carroll Hicken (left) owner of Highway Machinery Company, Waukesha, Wisconsin, is a long-time user of Amsco equipment. His firm designs and manufactures self-propelled machines for crushing road material, both gravel and stone. All of their machines are rented out or sold to contractors, with maintenance and service handled by Highway Machinery.

For years, the company has used Amsco Manganese Steel Crusher Rolls exclusively. Amsco Manganese welding rods and bars are also used for build-up. On a typical rental machine, pictured at right, the Amsco rolls had *crushed over 50,000 yds. since their last build-up* six months before.

Mr. Hicken says that with Amsco Manganese rods he can multiply the life of a roll by 5 to 10 times. He adds—"They have proven very fine, and we're getting more yardage than with any rods we formerly used."

AMSCO

AMERICAN Brake Shoe COMPANY

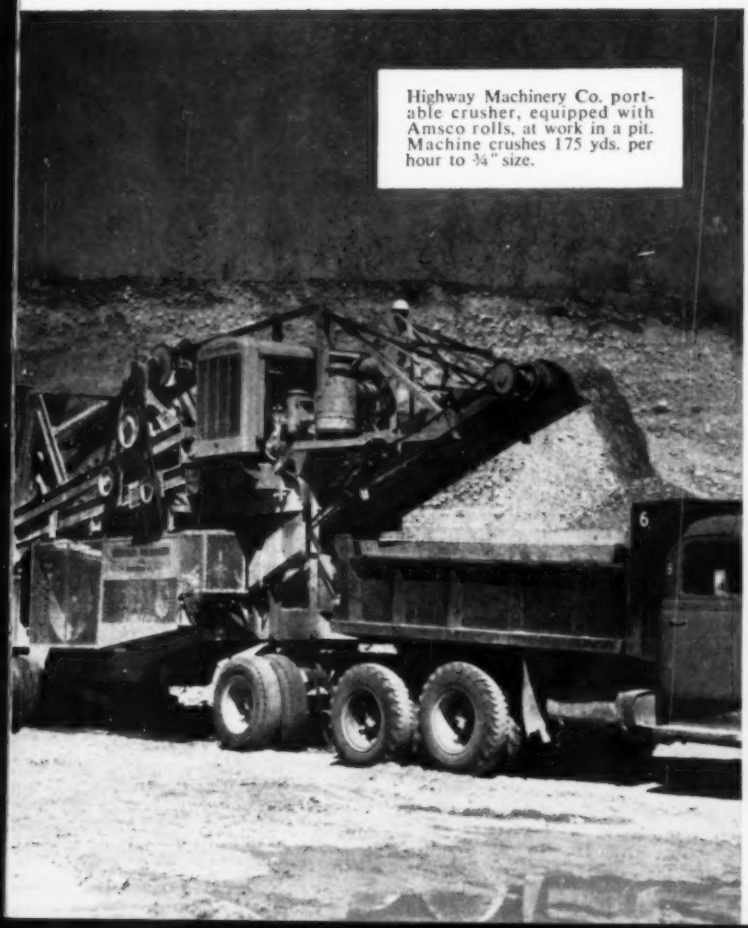
American Manganese Steel Division • Chicago Heights, Ill.

Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed by Canadian Liquid Air Co., Ltd.

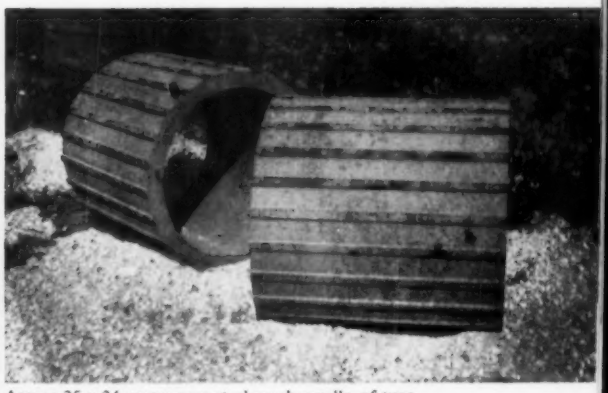
Enter 132 on card, page 197

Northwest shovel, equipped with Amsco Dipper and Simplex 2-Part Teeth, at work on Cross Westchester Expressway project.

Shovel operator, Walter Reich, inspecting Amsco Simplex 2-Part Teeth used on Mt. Vernon Contracting Corp. shovel.

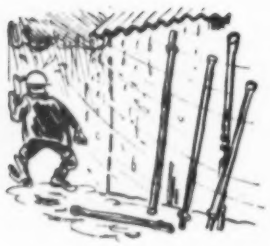


Highway Machinery Co. portable crusher, equipped with Amsco rolls, at work in a pit. Machine crushes 175 yds. per hour to ¾" size.



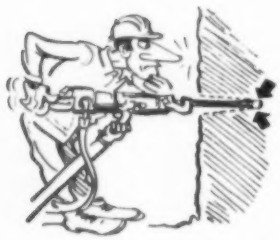
Amsco 25 x 24 manganese steel crusher rolls, of type used in portable crusher at left.

Welder demonstrating how Amsco Manganese rods are used for build-up on rolls.



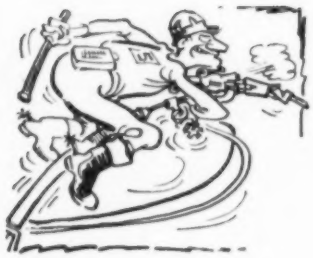
Store your steels outdoors without protection against rain and snow.

Handle steels roughly.



Use the steel as long as you can without re-grinding.

Do not follow the instructions for the grinding of drill steels.



Exert the greatest possible force on the pusher. In this way you will bend the drill steel and eventually manage to break the rod.

Use a drill with a worn-out rotation device. The heavy stress on both the rod and the bit will achieve early breakage.

Keep worn-out chucks and pistons in your rock drills. This is the recognized way to destroy the shank of the drill steel.

Use steels for scaling. Experience everywhere shows that this is by far the quickest and most successful way to ruin a steel.

● Latest rough on rods techniques have been here assembled, illustrated, and described by Atlas Copco's cartoonist. Modern methods of ruining tungsten-carbide-tipped drill steels most effectively are here realistically presented. The sketches are said to be based on techniques reported from sources in many countries in which Atlas Copco air compressors, rock drills, and other pneumatic tools are sold and serviced.

Vermiculite Institute

(*Continued from page* 90)

—in this case concrete joists—that is currently available to builders, Mr. Babb stated.

The second publication, *Machine Placement of Vermiculite Insulating Concrete,* covers procedures for sampling and determining densities and compressive strengths. The third folder covers water-repellent vermiculite for masonry wall insulation.

C. H. Wendel, chairman of the market development committee, reported that vermiculite sales had increased again in 1959, and that it was one of the industry's best years in the decade just closed.

L. G. McDiarmaid, Vancouver, B. C., was elected president of the institute, succeeding W. V. Culver, Seattle. L. K. Irvine, Salt Lake City, Utah, and C. H. Wendel, Los Angeles, Calif., were named to the board of directors. Holdover directors, besides Mr. McDiarmaid, are R. W. Sterrett, Chicago, and L. J. Venard, Minneapolis, Minn.

Edward R. Murphy was returned as managing director, and Walter J. Bein, Chicago, was re-elected treasurer.

The delegates also made a field trip in the Phoenix area to inspect block walls insulated with vermiculite.

Coming Role of Pozzolans

(*Continued from page* 99)

SUMMARY

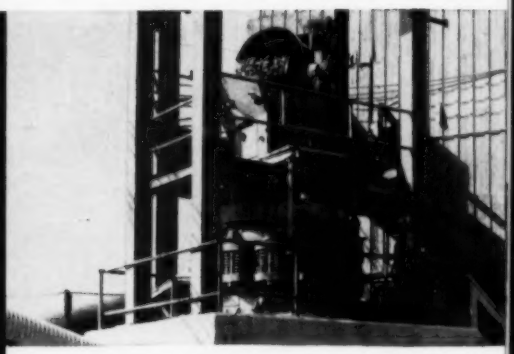
In summarizing, it may be pointed out that heat activation at relatively low temperatures can be accomplished in several types of kilns and calciners suited to the particular physical properties of the raw material.

The choice may hinge on the conservation economics as it affects complete or partial utilization of the deposit, as well as on the ability and suitability of the prepared material particles to hold up under the process without breakage or attrition and dusting.

It is also to be noted that, irrespective of the kiln or calciner type used, the basic control problem will center on the accurate maintenance of pre-established time-temperature history—more so, perhaps, than in many better known processes.

Enter 135 on card, page 197 ➔

BIG TONNAGES of quality aggregate produced at low cost with SYMONS® Cone Crushers



for STATIONARY service . . . Symons Cone Crushers are built in Standard, Short Head, and Intermediate types, with crushing heads from 22" to 7' in diameter—in capacities ranging to 900 or more tons per hour, for primary, secondary and finer reductions.

for PORTABLE service . . . Symons Cone Crushers are being used in increasing numbers for portable and semiportable crushing plants. Illustrated is a typical Cedarapids® Intermediate Scalping Unit, using a 4-ft. Symons Cone Crusher. Unit is serving a large Midwest sand and gravel producer.

Typical of today's modern highway construction is this view of the modern Freeway in Oakland, California, showing three levels of highway structure over two levels of railroad.
(Photo courtesy California Division of Highways)

C-159

The big tonnages of specification aggregate, bituminous mixes, crushed sand and cement required to meet the ever-increasing needs of the construction industry are produced by Symons Cone Crushers at low cost. Good reasons why these efficient crushers are the leading choice of producers and contractors building highways, dams and hydro projects, bridges, as well as commercial building construction.

It will pay you to specify and use Symons Cone Crushers for both stationary and portable service. *Write for descriptive literature.*

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

NORDBERG MACHINERY

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SYMONS . . . a registered Nordberg trademark known throughout the world

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Where heavyweights move job records prove...

FIRESTONE IS HAUL-ROAD CHAMPION!

Switch to Firestones and hold downtime to a contract-meeting minimum. You can do this because Firestone off-the-highway tires are job-engineered for the toughest projects. There's a Firestone for every need on any project—and every one is built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires. Exclusive Firestone SHOCK-FORTIFIED nylon cord bodies guard against impact damage. And what's more, Firestone's Giant Tire Service backs up every Firestone tire—that means a Firestone Tire Expert will handle all your tire maintenance problems! Turn downtime into worktime—call your Firestone Dealer or Store today.

ALWAYS SPECIFY FIRESTONE TIRES WHEN ORDERING NEW EQUIPMENT

Super Rock Grip Wide Base* Super Rock Grip Deep Tread*

TUBELESS OR TUBED

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BETTER RUBBER FROM START TO FINISH

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Uncertain Quantity of Materials

A higher court held recently that if a buyer and seller of materials disagree as to a quantity of materials, the testimony of witnesses will be utilized to arrive at the lawful quantity.

For example, in *J. L. Products Company* v. *Martin*, 328 S. W. (2d) 399, it was shown that a contractor took chat from a quarry owner's pile without weighing it. In subsequent litigation the witnesses testified that, judging from the physical dimensions of the pile before the loading began and the physical dimensions of pile after removal of last load of chat by the contractor, not less than 15,300 tons of chat had been removed by the contractor. Hence, the higher court ordered the contractor to pay cash to the J. L. Products company for 15,300 tons. The court said:

"Many authorities have recognized that quantity frequently is not susceptible of precise determination, and, with no better evidence obtainable, (it) properly becomes an appropriate subject of opinion evidence by witnesses whose testimonial qualifications show them to be capable of formulating reasonably accurate and trustworthy opinions."

What Is Middle of Stream?

According to a late leading higher court decision, the "middle of a stream" may be the same as the middle of the channel of a non-navigable river, or it may be entirely different.

For example, in *Bishel* v. *Faria*, 347 Pac. (2d) 289, the testimony showed that a disputed property is situated on an island in a river. The island has valuable sand and gravel deposits. Two property owners owning land on opposite sides of the stream claimed ownership of the island. One argued that the boundary is the center line of the main channel of the river, and that it is to be determined by measuring the width of the river between the low banks during the eight months of average flow. But the other property owner contended that the boundary is the center line of the river as measured between the high banks during the high flow in the spring months. The fact that the island is very valuable resulted in complicated and long legal procedure.

The higher court settled the argument by holding that the ownership of the island, having sand, gravel and alluvial deposits, and the thread or center line of the river are to be determined as follows:

"The middle of the stream may be the same as the middle of the channel, or it may be entirely different. The thread of a stream is the middle line between the shores, taking it in the natural and ordinary stage of water, at its medium height, neither swollen by freshet nor diminished by drought, irrespective of the depth of the channel or the lowest and deepest part of the stream."

Directions Not Followed

Last month a higher court rendered an important and unusual decision, particularly from the standpoint of readers of PIT AND QUARRY. Readers should refer this new decision to their lawyers and, also, keep it for ready reference to avoid future heavy and expensive liability in damages for injuries to all persons, including motor vehicle drivers.

This higher court, in effect, held that if a person comes on private property and fails to follow rules, regulations, and instructions of the property owner, and if he sustains an injury, such injured person can recover no damages from the owner of the premises.

For example, in *Maynard* v. *Walker's Ready Mix Company*, 345 Pac, (2d) 478, the testimony showed these facts: The Walker Company operates a ready-mix business, mixing and delivering concrete in transit-mix trucks. To facilitate placing the ingredients of concrete in its trucks, the company stored supplies of sand, gravel, and cement in receptacles at an elevation higher than that at which the transit-mixers were loaded. These receptacles, in turn, were supplied by trucks which ascended a ramp to discharge their cargoes at a point some 20 ft. above the level at which the transit-mixers were filled.

The concrete company maintained a private roadway over the top of this ramp, and required supply trucks to ascend the mound by a gradual slope, discharge their cargo, and descend by a steeper decline. There are no guard rails on the road.

One day a man named Maynard, driving a truck for a cement company, drove a load of bulk cement to Walker's Ready Mix Company. He was driving a tractor, a semi-trailer, and a pull or full trailer. He entered the private roadway. An authorized employee of Walker's Ready Mix Company met Maynard near this entrance and directed him to continue up the roadway on the gradual grade, discharge the contents in part, and descend by the steep grade. Maynard followed this course, in part; but after discharging the cargo of the rear trailer he used his own judgment, disobeyed the instructions of the concrete company's employee, and attempted to back his truck in order to reach a better location for discharge. The rear trailer slipped over the side of the roadway and fell, dragging the other units with it and causing Maynard serious injuries. Maynard sued Walker's Ready Mix Company for heavy damages.

The higher court refused to hold the concrete company liable in damages to Maynard, saying:

"Plaintiff (Maynard) argues that there is no evidence that he diverged from his purpose of delivering cement nor that he utilized the premises for a purpose for which they

Maneuverability for quick spotting at crusher and under shovel is essential to maintain fast cycle time. Drivers say these big units handle almost as easily as their own cars—particularly like positive brake control on loaded downhill runs.

Talk about efficiency

...four replace nine

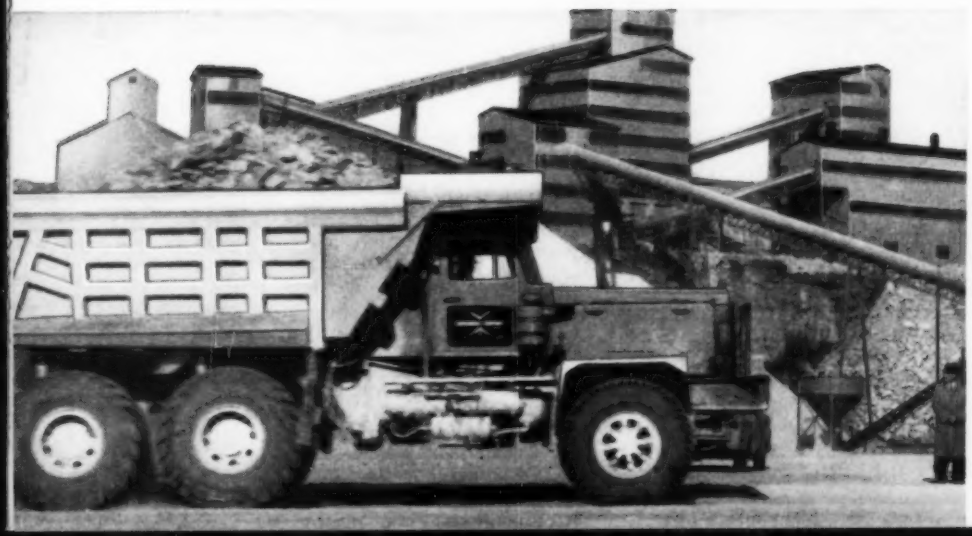
Big tonnage operations like those of Consumers Company, McCook, Ill., division of Vulcan Materials, Inc., depend on modern, efficient equipment to keep operating costs low. In the quarry, fast-action electric shovels pick up 5½-yard bites of shot rock. Four Mack LYSW end-dumpers, working two to a shovel, hustle forty-ton loads three-quarters of a mile to the crusher . . . a total of 288 trips each day. Before Vulcan put the four big Macks on the job, there were actually nine smaller competitive models working under the shovels.

Outstanding performance characteristics enable Macks to contribute to successful quarry and mining operations throughout the world. Plenty of power for fast getaways under full loads. Massive, self-equalizing, air-over-hydraulic brakes and easy, positive power steering for safe, fast maneuverability at shovel and crusher. Traditional Mack construction throughout to reduce downtime and maintenance.

These are sound reasons why Macks are first choice where profitable operations rely on truck performance . . . because they mean that when you purchase a Mack, you get a truck which will outwork and outlive anything in its class—that will pay for itself again and again by delivering top work capability per dollar invested. Your nearby Mack branch or distributor will be very glad to give you full details on the Mack best suited to your operation. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

MACK FIRST NAME FOR **TRUCKS**

Fast, modern electric shovels have to hustle when Mack 40-tonners like these gang up on them. For non-stop production, Vulcan assigns two Macks to each shovel. Exceptional speed and ease of handling are characteristics praised by drivers.



Big trucks are the profit makers in quarry operations. LYSW Macks like these easily handle 40-ton loads—hustle 72 trips a day from quarry to crusher—require only routine service and downtime.

Enter 138 on card, page 197

were not intended. But this is beside the point. The means of access to the premises chosen by him . . . were contrary to the instructions."

Hence, purely for the reason that Maynard failed to follow instructions given to him by the concrete company's employee, as to what route to take to discharge the load of cement, the higher court refused to award Maynard any damages.

Alleged Partner Liable

Modern higher courts consistently hold that a financially responsible partner may be held liable for payment of all debts owed by the partnership. In other words, if other partners in a business are without funds, the financially responsible partner may be compelled to pay the total amount of the debts accumulated by the partnership although the debts may exceed the total assets of the business.

Another important point of law decided by a higher court only last month is as follows: although a person is not a partner in a business, he will be held liable as a legal partner, if he performed any act which led creditors to believe that actually he is a partner in the business.

For example, in *Rogers* v. *T. I.*, 328 S. W. (2d) 483, the testimony showed these facts: The T. I. sold building material to the C. B. Company amounting to $34,558.32. The officials of the latter company contended that W. Rogers and L. Coggins were partners in the firm of C. B. Company. Rogers contended that he could not be liable for payment of any part of the amount of $34,558.32 because he was not a partner in this business.

Without considering whether or not Rogers actually was a legal partner in the firm of C. B. Company, the court listened to testimony of employees of T. I., who testified that Coggins introduced Rogers to them as his partner and that Rogers represented to them that he was a partner. In view of this testimony, the higher court held that Rogers is in effect a legal partner and liable for payment of $34,558.32 due T. I. The court said:

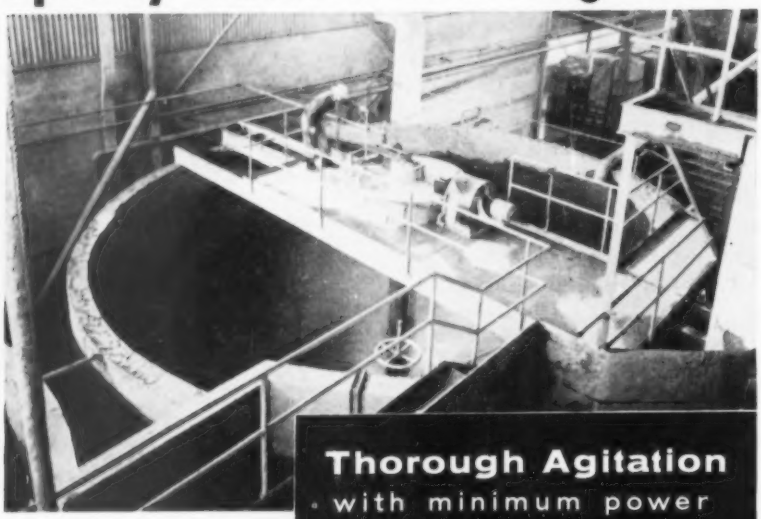
"Without discussing the testimony in further detail, we conclude there was sufficient evidence to sustain the answer to issue one that Rogers was a partner. After a careful consideration of the entire records, we conclude that said finding was not contrary to the overwhelming weight and preponderance of the evidence."

This court went on to explain that a valid and legal partnership is formed if (1) both parties agree to contribute "something" of value to the business. This "something" may be capital, property, chattels, or personal services; (2) both parties agree to share in the profits, irrespective of what proportion of the profits each receive; (3) both parties agree to share in all losses; and (4) the parties intended to form a partnership. Under these circumstances a valid and legal partnership is formed.

On the other hand, the courts hold that an agreement to share profits and losses does not constitute a valid partnership if the testimony shows that no partnership was intended or created. A jury may decide whether a valid partnership existed.

As above explained, a partner-

Specify MANITOWOC Agitators



Look at the Manitowoc Agitator above, installed in a clay slurry tank 30 ft. in diameter and 25 ft. high. This is but one of dozens of Manitowoc Agitators found in the foremost cement producing plants, both in this country and overseas. These quality conscious operators depend on Manitowoc for complete, uniform and economical slurry agitation . . . *plus* design which permits the installation of agitators in tanks up to 100 ft. in diameter, or larger.

By combining mechanical and air agitation, Manitowoc Agitators maintain consistently uniform particle size and chemical analysis in any type of slurry *without* a continuous application of air. As a result, compressed air consumption and operating costs are substantially reduced. Combine this cost-saving feature with the exclusive Manitowoc Control Valve, scientific air pipe design with an improved check valve, and rugged, channel construction agitator arms and you have the finest slurry agitator for turning out highest quality cement at *your* plant. Write now for detailed, helpful information.

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ship may be implied by the courts whereby a person who does not intend to be a partner may be liable for the obligations assumed by the partnership. For illustration, the law often implies that a partnership exists for the sole purpose of holding a person who has assets liable for the debts created in the business venture, for example, if a person who is not actually a partner permits a partnership to use his name.

Skid Marks No Evidence

Last month a higher court rendered an unusually important decision holding that (1) tire skid markings on a highway or street are not good evidence as to the rate of speed a vehicle was traveling, and (2) that a jury will weigh contradictory testimony of two drivers in the collision, and generally the jury's decision will be upheld by the higher court.

For instance, in *Climo* v. *The C. C. Company,* Cal. Rptr. 468, the testimony showed that a truck driver named Lamp was an employee of The C. C. Company. He was operating a truck and trailer loaded with concrete pipe upon a through highway. Climo was operating her automobile, and as she attempted to cross the through highway, her car was struck by the truck, resulting in severe injuries to her. A suit was filed against The C. C. Company for damages.

During the trial Lamp testified that he was proceeding along the through highway approaching the intersection at a speed of some 35 m.p.h. He claimed that he saw the vehicle operated by Climo slowly approaching the intersection. He said that it had evidently stopped in the vicinity of a stop sign, which was some considerable distance away from the intersection area. He testified that he assumed that the vehicle would be stopped and not driven in front of his approaching truck and trailer. He claimed further that when he saw that the driver of the automobile was not going to stop but was proceeding slowly across the intersection, he applied his brakes and endeavored to swerve to the right but was unable to avoid the collision.

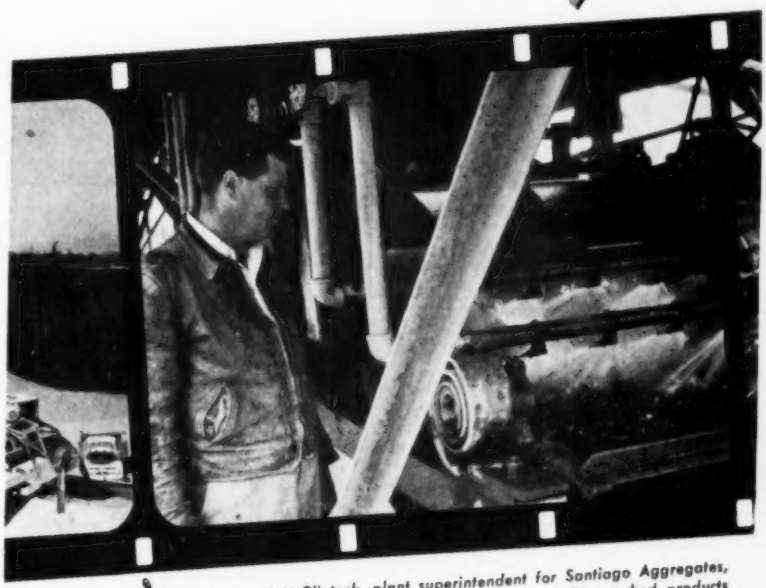
Other testimony, including testimony of Climo, was to the contrary. Also, the evidence was that his vehicle laid down 67 ft. of tire marks upon the pavement prior to the point of impact. This indicated that he was driving faster than 35 m.p.h.

The jury considered all testimony and held that Climo could recover no damages from The C. C. Company because the collision did not result from negligence in the part of Lamp. The higher court approved the jury's verdict, saying:

"The question of whether Lamp used ordinary care is one to be determined by the jury from a fair and impartial consideration of all of the evidence. It would seem, therefore, that the matter of Climo's alleged negligence was one properly involved in presenting the case to the jury."

This court also held that the length of tire skid marks is not conclusive evidence of the speed a vehicle was traveling. This court explained that when it is borne in mind that these markings are the result of speed, or of time elapsed,

Screen Story...



Mr. Howard McClintock, plant superintendent for Santiago Aggregates, Orange, California, watches one of their top quality washed products come over the upper deck of a 5' x 12' Overstrom Double-Deck Screen equipped with water sprays. This 250 TPH plant utilizes Overstrom Vibrating Screens throughout — from bull screen to final sizing.

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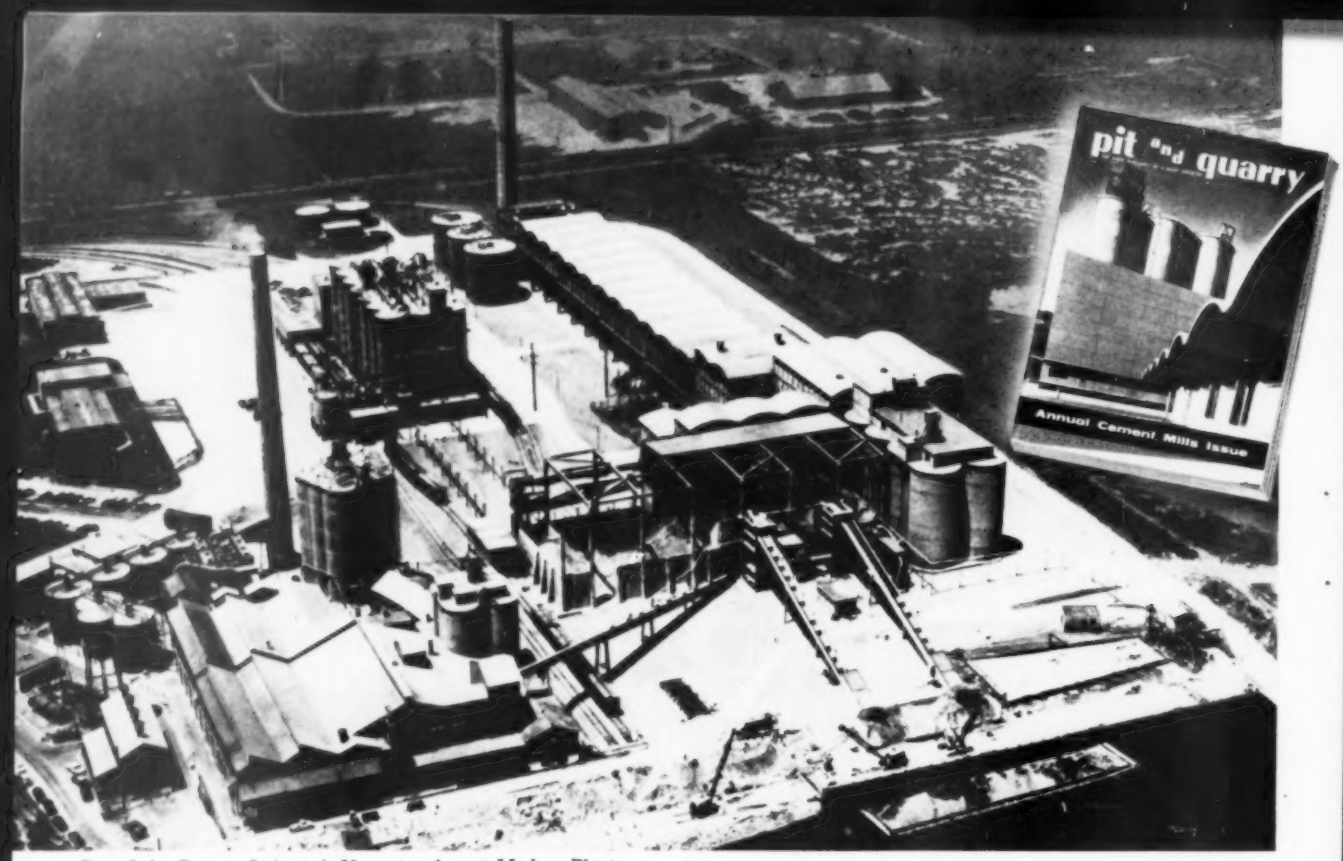

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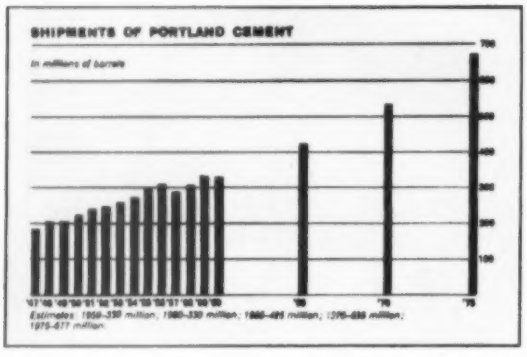

Courtesy of American-Marietta Co.

The level of new construction continues to rise and authorities agree it will continue over the next 15 years. See Chart.

To meet construction's increased demands for cement, industry plans, as of January, 1960, call for completion of 8 new plants and 12 major expansion programs in 1960-61. *Since then additional new plants have been announced.*

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"40% more usable life—more resharpenings!"
"Bit and rod life are well above average!"
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"More rigid—drills straighter holes!"*

**Names of men quoted available on request*

The comments above are actual quotes from project managers, job superintendents, and drill superintendents who have tested new Coromant rope-thread bits and steels. They've learned, on-the-job, the benefits they—and you—can expect!

For example: The new rope-thread (only two turns per inch) holds tight in use, yet permits hand uncoupling. Reports show that the time saved results in more footage drilled per shift. Bit footage is well above average too, with less loss of carbide inserts. Prime quality ore plus nickel-chrome alloy permits cold-rolling from billets for greater strength, life and rigidity. And only with Coromant rope-thread steels can you re-thread without heat treating, too. Do it yourself, or at any nearby machine shop.

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or the position of objects, it must be apparent that no set of figures or marks or diagrams can be considered as conclusive evidence of the speed of a motor truck when a collision has occurred.

Contract Ineffective

Seldom, if ever, has a court decided that for practical purposes a written contract is ineffective and its terms incapable of being fulfilled by either contracting party. Last month, however, a higher court rendered such a decision, based upon evidence that when the contract was signed, both contracting parties were mutually mistaken as to their assumed obligations.

For instance, in *S. v. C. S. Company,* 1 Cal. Reporter 257, the testimony showed that S. owned certain land on which there was sand, gravel, and other construction aggregates. Also, there was considerable clay overburden. On August 25, S. and the C. S. Company signed a written contract for the purchase and removal by the company of sand, gravel, or aggregates at 15 cents per ton, with a minimum agreed payment of $1,000 per month. By the terms of the contract, the C. S. Company could remove only the aggregates, the clay having been sold by S. to the J. Company, which planned to establish a plant for the manufacture of bricks. Because of difficulties encountered by the J. Company it ultimately obtained a cancellation of this contract, leaving no agreement for the removal of the clay.

For a period of 2 years the C. S. Company failed to remove any of the aggregates from the property and then S. commenced a suit against the former, alleging a breach of the contract of August 25 and asked the court to award him heavy damages. The officials of the C. S. Company defended the suit by proving that the aggregates on the property were covered by an overburden of clay and alleged S. was obligated to remove this clay overburden.

The trial court, after hearing all testimony, decided that the contract was ambiguous and uncertain on the question of whose duty it was to remove the overburden of clay.

The higher court agreed with this verdict, holding that the August 25 contract had been entered into under a mutual mistake of fact because at the time of the execution of the contract both parties believed that the deposit of clay would be removed by the J. Company.

Hence, the higher court refused to hold either S. or the C. S. Company liable in damages to the other. Thus the contract for present practical purposes is ineffective. The higher court said:

"All intendments must be indulged on appeal in favor of the trial court's findings. Applying this rule, there is sufficient evidence to support the finding attacked. It was only after the contract for the removal of the clay had been cancelled (by J. Company) that appellant (S.) finally took the position that respondents (C. S. Company) were in default of their contract."

Employee Is Injured Customer

There has been considerable discussion over the legal question: If a company's employee is injured while on the employer's premises, and doing work not within the scope of his regular employment, can he recover compensation under the State Workmen's Compensation Act?

A few weeks ago a higher court answered this legal question in the affirmative, although the injury arose under very peculiar and unusual circumstances.

In *Torrey v. Midland,* 93 N. W. (2d) 135, the testimony showed that a company employed one Torrey as manager of a certain department and its operations. His duties included responsibility for receiving, storage, and shipment of various materials. He also was responsible for all of the repairs and maintenance in the building, and in addition occasionally he repaired merchandise brought to his employer for storage and sale.

One day Torrey was seriously injured while using a machine to do work on materials which he had purchased from his employer for his personal use.

The higher court held that Torrey was entitled to receive compensation under the State Workmen's Compensation Act.

The basis for this decision was that Torrey, in purchasing the materials, was a customer of his employer. The court said that it could not say that the mere fact that Torrey happened to be doing work on materials which he had purchased from the employer, for his own personal use, made the situation different from what it would have been if he had been doing work on materials for someone else who had made a similar purchase from the employer.

Source of Silicosis Must Be Proved

According to a late leading higher court decision, an employee suffering from the disease silicosis can recover no compensation, under the State Workmen's Compensation Act, unless he proves that he contracted the disease while attending to his regular work, during the last two years.

For example, in *P. v. L. C. S. Company,* 328 S. W. (2d) 539, it was shown that an employee, named P., 50 years of age, had been employed by the L. C. S. Company as an operator of a wagon drill for about 2 years and 4 months. P. drilled holes in the limestone rock inside underground rooms of large size for charges of explosives.

One day, while he was helping with the moving of the drill, P. was struck in the chest by the steel tongue and began to suffer chest pains. He continued to work for some two weeks, but the soreness and pain in breathing became so severe that he consulted a doctor. A thorough examination, including a lung biopsy, established that P. was suffering from silicosis, bronchiectasis, and emphysema. There was testimony that 40 percent of appellant's disability was due to the silicosis and 60 percent to the bronchiectasis.

It is interesting to observe that the Workmen's Compensation Board denied P. claim for compensation. The higher court upheld the board's decision, since no testimony was given that P. was exposed to hazards of the disease of silicosis or any occupational disease in his employment with the present employer for two years before his disability. The court said:

"We are neither qualified nor disposed to make a technical analysis of medical testimony. However, the asserted inconsistency disappears

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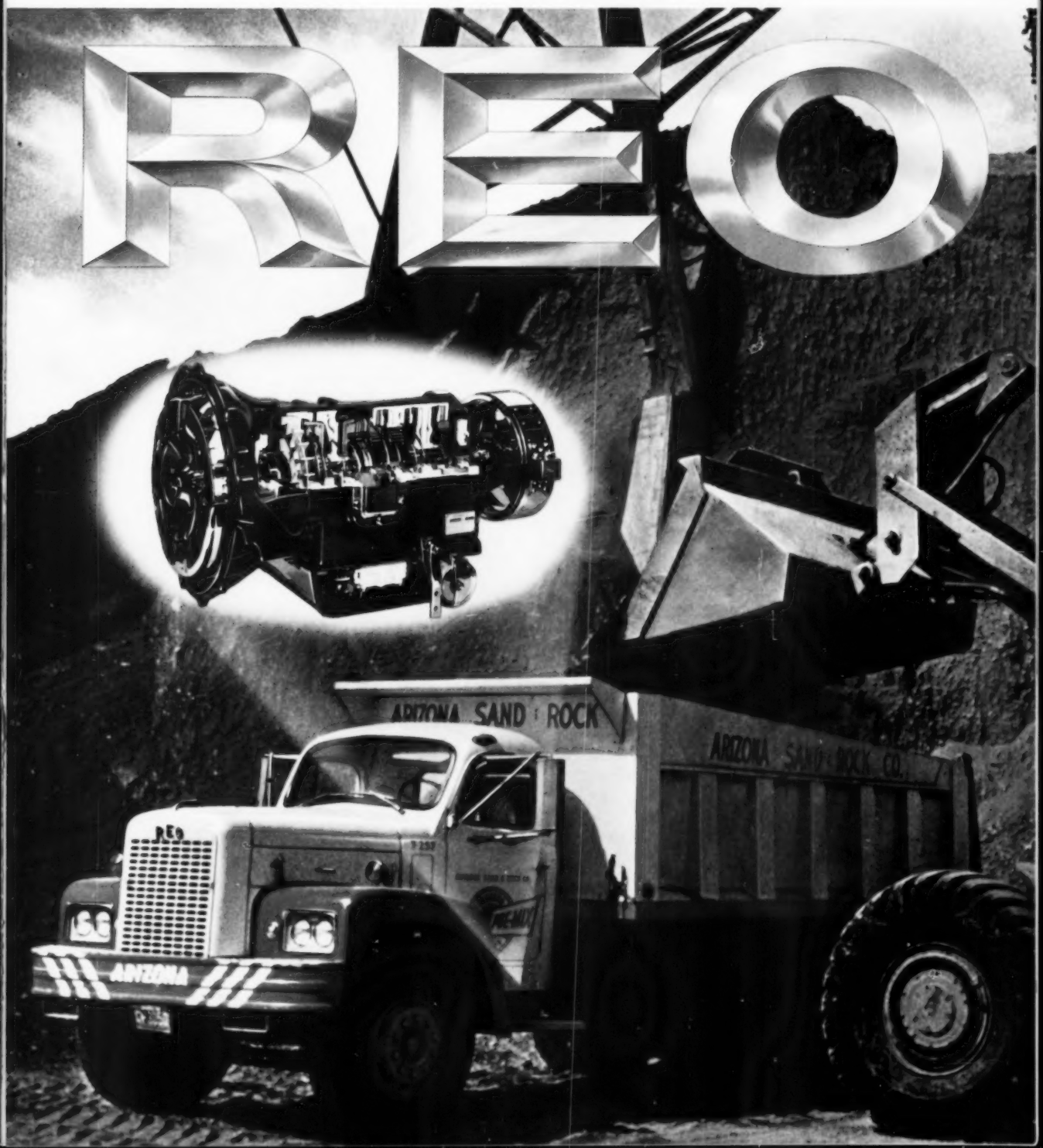

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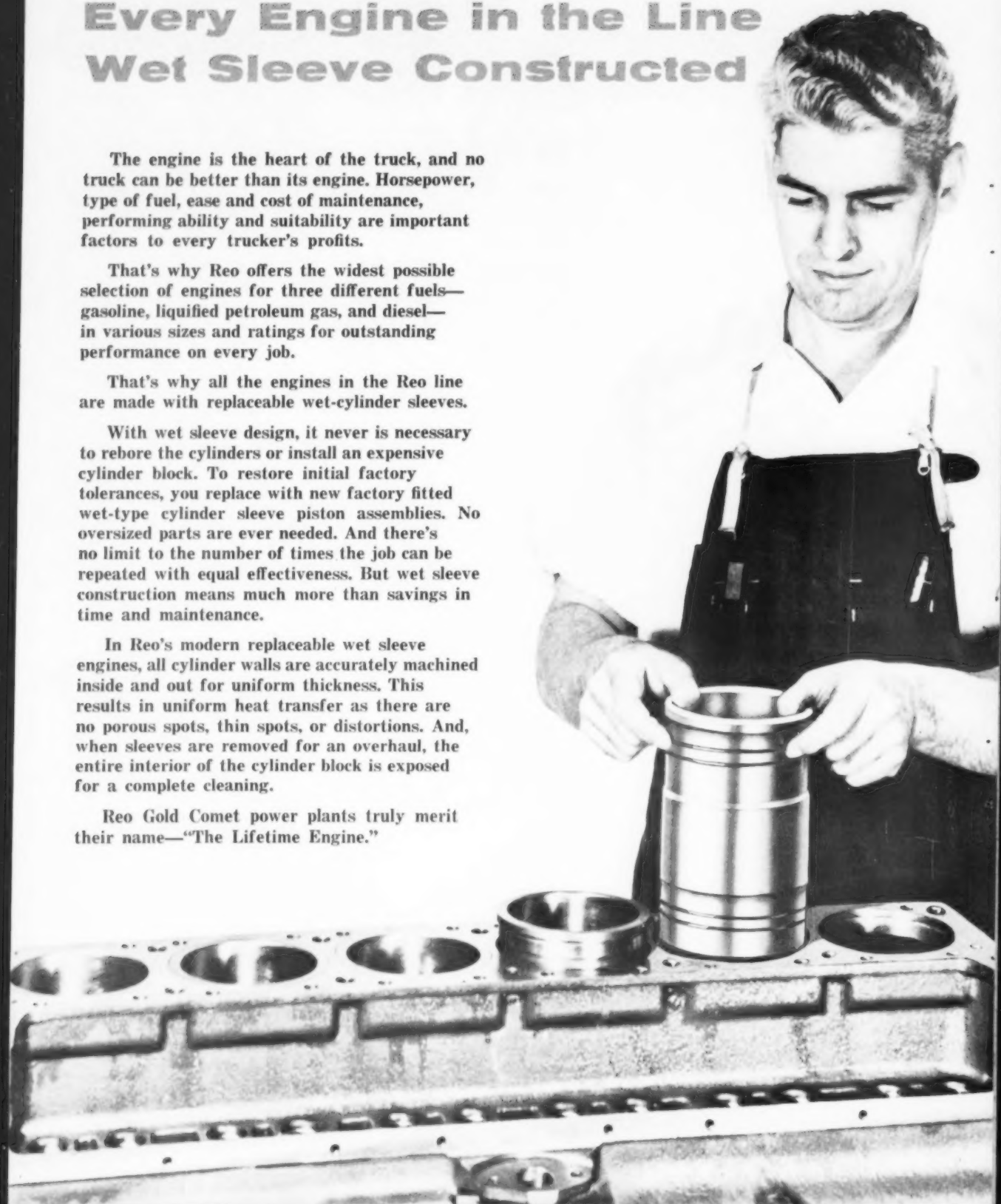
With wet sleeve design, it never is necessary to rebore the cylinders or install an expensive cylinder block. To restore initial factory tolerances, you replace with new factory fitted wet-type cylinder sleeve piston assemblies. No oversized parts are ever needed. And there's no limit to the number of times the job can be repeated with equal effectiveness. But wet sleeve construction means much more than savings in time and maintenance.

In Reo's modern replaceable wet sleeve engines, all cylinder walls are accurately machined inside and out for uniform thickness. This results in uniform heat transfer as there are no porous spots, thin spots, or distortions. And, when sleeves are removed for an overhaul, the entire interior of the cylinder block is exposed for a complete cleaning.

Reo Gold Comet power plants truly merit their name—"The Lifetime Engine."



when all the evidence is considered. It was established that silicosis, once it is started, continues to develop after the person is removed from the presence of the dust causing the same, whereas in all other types of pneumoconiosis or dusty lung diseases this is not true."

Law of Percolating Water

Last month a higher court rendered an unusually important decision to this effect: The owner of a gravel pit may dig therein and apply all that is there found to his own purposes at his free will and pleasure absolutely. This is so although he intercepts and draws off percolating water which previously was advantageously used by the owner of adjacent land.

For example, in *Behrens* v. *Scharringhausen*, 161 N. E. (2d) 44, the testimony showed that one Behrens owns and lives on certain farm land and derives his livelihood from these farms. A supply of water is essential for livestock and crops, and his own personal daily requirements. In the past he obtained water from beneath and upon these lands.

Scharringhausen is engaged in the business of excavating and selling sand and gravel from a gravel pit adjacent to the farm lands of Behrens. Blue clay is found in the gravel area, and in a dry gravel pit it is possible to pick out the blue clay, but when the gravel area is covered with water, the blue clay cannot be seen and becomes mixed with the gravel, making it unsalable.

Subsurface waters commenced to ooze into the gravel pit, and Scharringhausen installed two electric pumps to free the pit of water and to permit him to see the blue clay.

Behrens filed suit against Scharringhausen and asked the court to grant an injunction to prohibit Scharringhausen from pumping water from his gravel pit, claiming that use of the pumps rapidly lowered the ground water table in Behrens' farms, requiring him to sink deeper wells and install additional pipe and larger pumps to obtain the water necessary to his farms.

In view of the fact that Behrens still could obtain plenty of water by increasing the length of pipes and installing larger water pumps, the higher court refused to prohibit Scharringhausen from pumping water from his gravel pit, as above explained. The higher court said:

"Irreparable injury to the plaintiff (Behrens) is not established by the weight of the evidence. Plaintiff (Behrens) to the extent needed by him has been able to insure adequate well water by extending the lengths of the pipes in his wells and by installing larger pumps."

Employers Jointly Liable

Recently a higher court held that circumstances may exist whereby two separate employers may be compelled to pay compensation to an injured employee, or to dependents of an employee killed while attending to his regular work.

For instance, in *Dennison* v. *Peckham Road Corporation*. 68 N. E. (2d) 440, it was shown that a contractor contracted to do certain excavation work. He rented a power shovel and engaged an employee of the owner of the shovel

KOLMAN Radial Stackers Minimize Material Segregation

100'x24" Stacker is one of four Kolman Stackers used in the production of aggregate at Squaw Valley, California, in preparation of roads and site for the 1960 Winter Olympic Games. Stackers in the background are 70'x24".

PNEUMATIC-TIRED STACKERS IN LENGTHS UP TO 150 FEET

Reports of outstanding performance by the Kolman Model 101-R Radial Stacker are rolling in from all parts of the country. Owners are enthusiastic about bonus features offered by the Kolman Stacker — features like cable suspension of the boom, two-position wheels, balanced electric drive on the head section, power lift, power travel, and cam hinge. Sizes up to 150 feet long build larger stockpiles with a single setting.

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Kolman's cable suspension design eliminates the segregation encountered with stackers having fixed discharge heights. By raising the stacker as the pile is built, the fall of material is kept at a minimum.

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Even the largest Kolman Stackers are on dual pneumatic tires that roll easily on any level surface. Wheel assembles are mounted in quick-change frames to easily shift from radial arc position for stacking to parallel position for moving from one location to another in the stockpile area.

150'x30" Stacker shown includes electric power lift and electric power travel for finger-tip control of stacker discharge position.

100'x24" Stacker in the background stockpiles sand produced with an 8'x48" double-deck vibrating screen on a Model 101 Kolman Portable Conveyor-Screen Plant.

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to assist in operating the shovel. The employee's wages were paid by the excavating contractor. He was fatally crushed by the shovel.

In later litigation the higher court held that at the time the employee sustained the fatal injury he was employed by both the excavating contractor and the owner of the shovel. Hence, this court held both employers jointly liable for payment of compensation to the decedent employee's dependents, and said:

"The fact that the contractor had agreed to carry the decedent (employee) on its payroll while the work of excavation was being done did not serve to withdraw the decedent from the general employ of P. (owner of the shovel); nor is that relationship altered by this fact that the decedent may have been subject temporarily to direction of the contractor as to certain details of work at the site of the excavation."

Seller Not Obligated

Considerable discussion has arisen from time to time over the legal question: Is a seller of material liable to a general contractor for failure to supply materials specified by the property owner?

According to a late higher court decision, the answer is no, if the testimony proves that the seller did not agree to supply material to the contractor equal to the quality specified in the contract between the contractor and the property owner.

In other words, under no circumstances is an agreement between a contractor and a seller of materials varied by another contract between the contractor and a third party unless the seller agreed to comply with its terms.

For example, in *K. S. & G. Company v. Willis*, 260 N. W. 54, the testimony showed that a sand and gravel company contracted to sell gravel to a contractor, who had made another contract with a property owner to perform certain construction work and use gravel of a specified quality. The contract between the contractor and the property owner contained no specification clause of this kind. Later, tests were made for the property owner of the gravel delivered by the seller to the contractor. The inspector held that the gravel did not comply with the specifications in the contract between the contractor and the property owner and rejected the same.

In subsequent litigation, the contractor contended that he was not obligated to pay for the rejected gravel because it did not equal the quality in the specifications, and also because the seller had impliedly agreed to deliver a quality of gravel that would comply with the specifications.

As the contractor did not prove that the sand and gravel company had agreed to supply gravel equal to to the quality specified in the contractor's specifications, the higher court held the company entitled to recover full payment from the contractor, saying:

"The contract between the plaintiff (company) and the defendant (contractor) was wholly independent. . . It is our conclusion, therefore, that the contract between the property owner and the defendant (contractor) was wholly immaterial."

Law Not Strictly Construed

A reader asked: "Do the courts strictly construe state laws involving payments of compensation to employees who contracted the disease of silicosis?"

A leading higher court has held that although it will not vary the clear meaning of a state compensation law, yet it may "add to" an incomplete or ambiguous law.

For example, in *Kuntz v. A. S. Company*, 40 Atl. (2d) 864, it was disclosed that a state law provides that disability or death of an employee, caused by silicosis, anthracosilicosis, or asbestosis, shall be paid jointly by the employer and the state if the testimony shows that the disease "developed 5 years before the employee's application was filed."

An employee became totally disabled by silicosis which he contracted in a quarry and sand crushing plant. The testimony showed that he had worked in the plant almost *but not quite* 5 years before he became disabled.

The higher court held that the employer must pay full compensation.

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Automated Control

(*Concluded from page 89*)

photograph, the conveyors entering the loadout bin structure discharge to turnhead chutes. One of these is a four-position unit which delivers its feed to any of four underlying bins. The other is a 6-position turnhead. In four positions it discharges to four bins, and in the other two it delivers to either of two short 42-in. wide belt conveyors. Each of the latter, in turn, discharges to a four-position turnhead from which another set of four bins is supplied.

During the timed interval (blank belt space) between flow of separate specification material, the primary, six-position turnhead automatically swivels to the preselected position for delivery directly to a bin or to either of the following short conveyors. In the event that a specification has been incorrectly set on the rheostat panel, the operator can push a button that will cause the turnhead to discharge into a discard bin.

Each of the 14 loadout bins has a 200-ton capacity and all are fitted with low, medium, and full bin level indicating mechanisms. Ten bins are used for direct truck loading, and the other four to supply either truck or rail shipments. Materials are drawn *via* electrically-controlled hydraulically-operated gates.

Overall operations of the new McCook installation are under the direct supervision of Clay Lambert, vice-president, operations. He is assisted by R. W. McCall. Key personnel include H. Nester, general superintendent; W. Krohl, superintendent; and A. Reid, electrical superintendent.

With this large modern facility, Consumers Company Division has enhanced its established leading position as a major supplier of basic construction materials. In addition to crushed stone, these materials include sand, gravel, slag, ready-mixed concrete, concrete pipe, and prestressed concrete beams and pilings. All of the foregoing are produced in Consumers Division facilities. Actually, the division is a tri-state operation in its own right, with 11 producing installations in Illinois, 6 in southern Wisconsin, and 2 in northern Indiana.

The prestressed concrete plant, on a 20-acre site near the McCook quarry, is one of the most outstanding of such operations in the country. It is under the supervision of James Carnathan, plant superintendent.

In its ready-mix operations, the division is one of its own best customers. From 13 dispatching points in the greater Chicago area, one of the largest fleet of mixer trucks in the country services far-flung construction.

In its first 50 years Consumers Company Division has developed into one of the outstanding members of the industry. However, the outstanding project at McCook gives ample evidence that there is no intent to rest on those laurels. Top officials of this veteran organization that shows so much youthful vigor include W. A. Brown, president; D. B. Wendling, vice-president, sales; and Clay Lambert, vice-president, operations.

Industry Personalities

G. C. Urschel Jr.

GEORGE C. URSCHEL JR. has been elected president and chief executive officer of The Woodville Lime Products Company, Toledo, Ohio, succeeding GEORGE C. URSCHEL SR., who becomes chairman of the board. The junior Mr. Urschel became vice-president, production, two years ago; he will continue to direct plant operations.

FRANK E. MCCASLIN, president and general manager of Oregon Portland Cement Company, Portland, was recently elected to the board of directors of the Chamber of Commerce of the United States. He will serve for a two-year term as representative from the tenth election district.

H. R. Starke

HOWARD R. STARKE has been named executive vice-president and general manager of the Hawaiian Cement Corporation, Honolulu. He has been vice-president and technical director of the company, and also has held the same title with the Riverside Cement Company, Riverside, Calif. He will continue to be available to Riverside as a consultant. Riverside is a division of American Cement Corporation, which is also a majority owner in Hawaiian Cement.

The board of directors of Virginia-Carolina Chemical Corporation, Richmond, Va., has elected EDWARD R. ADAMS, ANDREW A. FARRELL and A. P. GATES vice-presidents. At the same time R. DANIEL SMITH JR., company attorney, was named general counsel.

Mr. Adams, formerly controller, was elected vice-president, finance; Mr. Farrell, general manager, mining division, was named vice-president in charge of mining; and Mr. Gates, general sales manager of the fertilizer division, was elected vice-president in charge of fertilizer sales.

CHARLES E. HEINRICHS, formerly vice-president in charge of mining, is relinquishing his duties as vice-president because of ill health. He will continue to serve as a consultant and a board member.

LYLE L. SHEPARD, president of Columbia Carbon Company, has been elected a director of The Ruberoid Company, South Bound Brook, N. J.

Even moving a blade-full of shot-rock around the curve, there's no hesitation, no sluing to spill the load. The TD-25's operator has separate speed control of each track to get full-capacity performance, full time. And only the new TD-25 has the power plus of the direct-start, turbocharged DT-817 International engine—that delivers 230 high-torque hp!

HOW POWER-STEERED, POWER-SHIFTED . . . TD-25 takes

—on California mining operation

Even before all the blast dust has settled, this International TD-25 is slamming tons of shot-rock from the benches, so trucks can resume hauling to the processing plant. Then, at this gypsum mine in California, the "25" takes over the "shovel-feeding" chore—dozing full blades of rock upgrade, downgrade, and 'round the curves, to help keep the big dippers swinging full. And in between times, the "25" takes over its third tough project: benching new haul road around mountain slopes!

Three slam-bang rock operations to handle—it's a made-to-order situation for the Planet Power-steered TD-25!

"Dead-track drag" eliminated! You don't brake a track and "half-kill" your pull-power to turn, as you do with king-sized clutch-steered crawlers. With Planet Power-steering you simply change the speed of one TD-25 track—on-the-go, and with 2-finger ease! Around comes the fully-loaded TD-25—with "live" power on both tracks and both tracks pulling. Load-limiting "dead-track drag" is eliminated!

And combined, on-the-go Hi-Lo power-shifting lets you match power to load, instantly—forward or reverse. Just shift one track to high range—the other to low—to do slope-hugging, full-bite benching, or to operate straight ahead with off-center loads!

The "25" is platformed on new 7-roller tracks with double-box-beam frames. The design provides super undercarriage strength for slam-bang conditions—strength to match the full effort of the direct-start, high-torque DT-817 International Diesel engine.

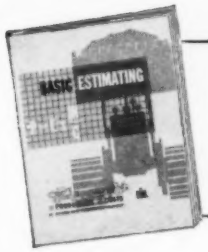
Power-steer and power-shift the TD-25 with king-sized loads. Measure the bonus capacity you get with exclusive Planet Power-steering and Hi-Lo power-shifting. See how this control combination enables you to outearn other big rigs up to 50%. Then measure what it means to get this double-barreled advantage *only* in the TD-25—and as standard equipment *to boot!* Let your International Construction Equipment Distributor demonstrate.

International Harvester Co.
180 North Michigan Ave.
Chicago 1, Illinois
A COMPLETE POWER PACKAGE

International® *Construction Equipment*

Enter 150 on card, page 197

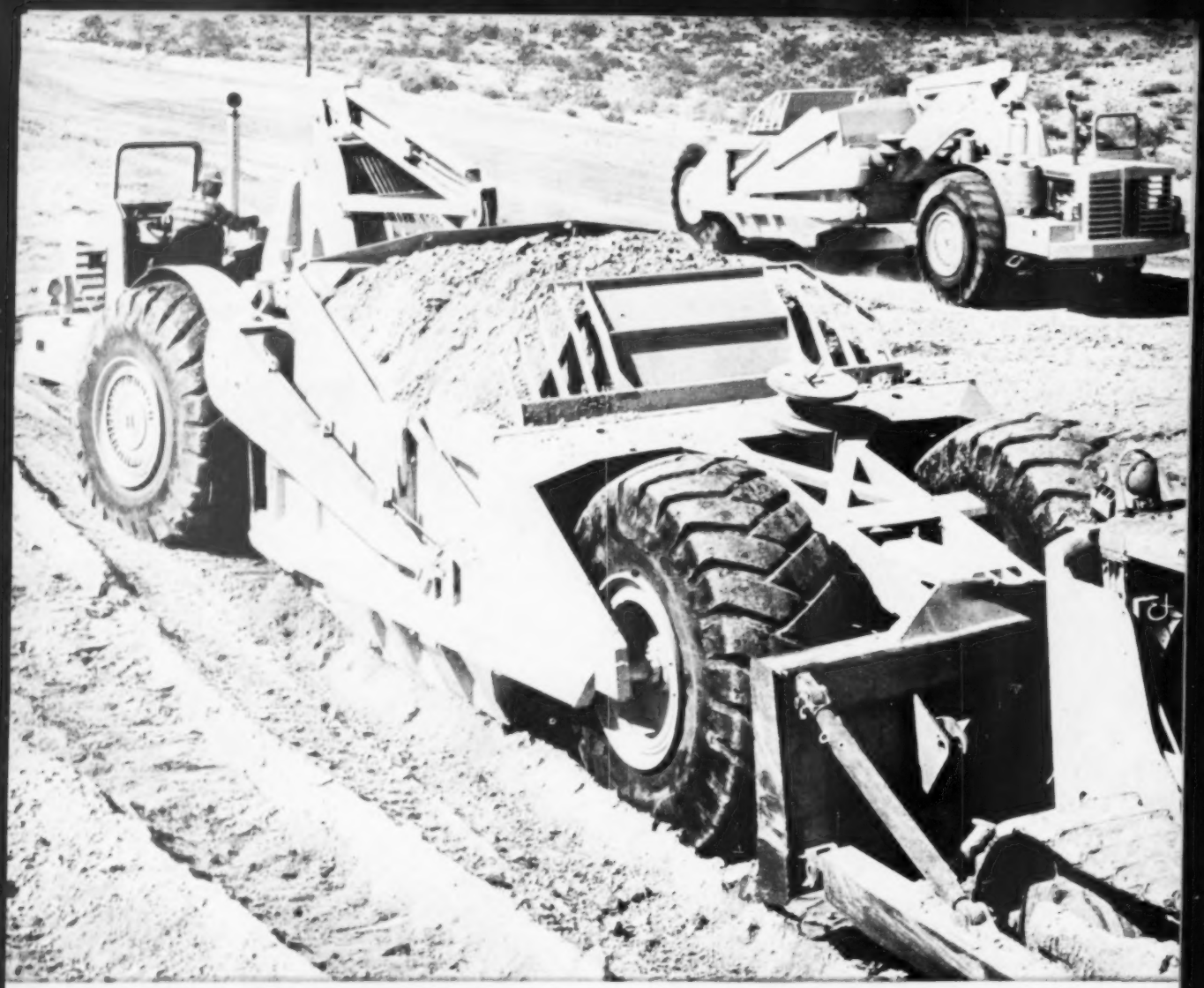
"Boulder-dozing" after blasting— The TD-25 does some "blasting" itself to move "big-as-a-house" hunks of rock aside. Heavy-duty TD-25 Dura-Rollers defy the rock-dozing "grind"—with the industry's thickest shells to prevent flexing—positive grit exclusion—and 1,000-hr.-interval lube capacity!



Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* Yours for the asking from your International Construction Equipment Distributor!

over three slam-bang rock jobs

Enter 152 on card, page 197



With the planet-powered 230-hp TD-25 pushing—and with 375 high-torque International Diesel hp under the "295's" hood—you heap on 34-cu. yd. with amazing new speed. Even in toughest loading conditions, "X"-member reinforcing maintains perfect Payscraper push-frame alignment!

Note that the Payscraper apron lifts to a big 94-inch opening. Two ejector-plate pushing members apply dozer-like action to force out the whole 34-cu. yd. load cleanly. The 122-inch bowl width speeds unloading, and loading, too—adds control ease and stability, loaded or empty.

How Payscraper* power and power controls boost your dirt-on-fill delivery!

You get highest power-to-payload punch of all rubber-tired rigs in the 34-cu. yd. International 295 Payscraper. The fast-slugging, high-torque 6-cylinder International DT-817 Diesel is the Payscraper power plant.

The direct-start, 375-hp DT-817 is turbocharged to give you all-altitude, high-efficiency performance—power for cycle-speeding rim-pull—plus time-saving "no-lag" control power!

You power-shift the Payscraper, up or down—and the 4-speed planetary-type, torque-converter transmission provides load-speeding *automatic* direct-drive lock-ups in second, third, and fourth gears!

You power-steer the 150,000-lb. loaded Payscraper almost as easily as a 3,600-lb. automobile. Payscraper gives you the big control advantages of (1), exclusive International rack-and-pinion plus tandem pump steering system; and (2), 3-degree forward spindle pitch that improves scraper balance and prevents "nose-downs" in high-speed turns!

You power-control Payscraper dirt-handling actions with fingertip ease with the International PTO-driven Cable Control Unit. One cable drum of this simple planetary system actuates the apron and ejector; the other drum positions the bowl to control loading and spreading! Reach-easy Payscraper power brakes give you fast, positive stopping!

Ease into the bump-smothering Payscraper seat—press the direct-start button—power-shift the outfit into action. Compare the speed of loading, roading, and dumping the 122-inch bowl. See how the advantages of DT-817 Diesel power and complete, positive Payscraper power control can boost your dirt-on-fill delivery. Choose the 2-axle "295," or 3-axle, 34-cu. yd. "495." See your International Construction Equipment Distributor for a demonstration!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* Yours for the asking from your International Construction Equipment Distributor!

International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE

Positive power-control of all operations adds safety, builds operator confidence — makes him "haul-speed minded" to help you get full capacity and profit from Payscraper speeds up to 33.5 mph. For example, safe, effortless tandem-pump power-steering leaves "the steering feel in the steering wheel"—gives positive, one-hand control!

N. J. Dunbeck

NORMAN J. DUNBECK, vice-president, industrial minerals division, International Minerals & Chemical Corporation, was named president of the American Foundrymen's Society at its 64th annual convention. He succeeds CHARLES E. NELSON, technical director, magnesium department, Dow Chemical Company. Mr. Dunbeck, who was vice-president of the 13,000-member A.F.S. last year, is on the national board of directors, and has been active in many of its technical studies.

Four appointments in the sales organization of Columbia Cement Corporation have been announced:

JOHN R. PINNICK JR., formerly contract sales representative for the Zanesville, Ohio, cement plant, has been appointed assistant sales manager in charge of highway sales.

JOHN K. BROWN has been named district sales manager for the Columbus, Ohio, office. In his new position he will be in charge of cement sales from the firm's Zanesville plant.

EUGENE P. O'BRIEN has been appointed district sales manager at Cleveland, Ohio, where Columbia Cement will establish a district office. Mr. O'Brien will be responsible for sales from the company's Barberton, Ohio, cement plant.

CLEMENT J. MERTES has been named assistant sales manager for the Cleveland district but will continue to maintain his headquarters in Massillon, Ohio, where he has served as a sales representative since 1942.

Three new sales representatives have been named for the Zonolite Company of Chicago:

JOE E. MITCHELL has been assigned to the Miami, Fla., district. RODNEY F. SCARBROUGH will cover western Tennessee, northern Mississippi, and eastern Arkansas. MORELL J. SHERMAN will take over the western portion of New York.

CLAYFORD T. GRIMM has been appointed manager of the architectural and engineering products department of Zonolite. He joined the firm after 10 years as assistant director of engineering and technology at the Structural Clay Products Institute, Washington, D. C.

D. E. SODOMA has been appointed manager of purchases for both California Portland Cement Company and its subsidiary, Arizona Portland Cement Company.

Warner Company, Philadelphia, has announced the appointments of FRANCIS V. J. HAGGERTY to the position of general manager of the Construction Materials Division,

Irving Warner Jr.

F. V. J. Haggerty

and IRVING WARNER JR. to the position of general manager of the Lime Division. Both men will be responsible for sales and operations.

Mr. Haggerty reached 25-year status with Warner last year; he started as a shipping clerk in 1934. Most recently he was general sales manager of the Construction Materials Division.

In transferring to the Lime Division, Irving Warner Jr. enters the division of the company which was largely developed by his father and his uncle. Mr. Warner was formerly operations manager of the Construction Materials Division. He has been a Warner director since 1955.

A number of promotions and appointments have been recently announced by New York Trap Rock Corporation:

JOHN J. FINEGAN has been promoted to the post of director of purchasing and stores. THOMAS S. HURLEY has been named assistant purchasing agent, succeeding the late FRANK D. LANSPERY. WALLACE M. DILLON JR. has been appointed electrical engineer for the firm. MRS. DENISE L. MILLS was named assistant secretary, succeeding LILLIAN M. BYERS, who retired recently. Mrs. Mills joined the firm in 1948 as secretary to WILSON P. FOSS, president, and continues in that capacity.

J. S. Wheeler

JOHN S. WHEELER, president of Ontario Building Materials Limited, Toronto, has been elected president of the Autoclave Building Products Association. It is the first time in its 54-year history that A.B.P.A. has chosen a Canadian president. The Association has about 80 manufacturing members, many of them Canadians.

Mr. Wheeler is also president of Cobo Minerals Limited, president of J. S. Wheeler Enterprises, and Chem-Sales Corporation of Canada. He is vice-president and director of Jamaica Iron Ore Ltd.

Ontario Building Materials Limited has been manufacturing sand-lime brick for several years. The firm is presently installing five new autoclaves, presses, and a rod mill.

CHARLES D. GABOR was recently appointed chief engineer of Harbison-Walker Refractories Company, Pittsburgh, Pa. He has been associated with the firm since 1941; in 1957 he was appointed assistant chief engineer.

THOMAS A. FITZGERALD has been appointed a sales representative in the northern and eastern Ontario region for St. Lawrence Cement Company.

CHARLES L. EISENHART has been promoted to the position of triple superphosphate manager at American Cyanamid Company's Brewster (Fla.) plant. He succeeds F. A. O'NEALL who has been named assistant chief engineer.

Enter 155 on card, page 197 →

HOW Rock-Ribbed Payhauler® GIVES YOU new load-speeding capacity!

Of all rear-dumps in their size classes, only the International 65 and 95 Payhauler models give you the weight-shedding, strength-multiplying, rock-ribbed corrugated bodies! You trade 2½ tons of power-wasting dead weight for 3 bonus tons of capacity in the new 95 Payhauler!

Only the 65 and 95 Payhauler models have the power "plus" of the direct-start, high-torque, 4-cycle 6-cylinder International "817" Diesel engine! The "95" is powered by the 375-hp DT-817 turbocharged Diesel; the "65" has the same basic, high-output power plant: the naturally-aspirated 250-hp D-817!

Choose the "95" with power-shift torque-converter, or 9-speed air-shift transmission. The "65" comes with 10-speed constant-mesh transmission. Both models have the load-speeding safety of reserve-area braking and "one-hand," road-holding power steering! Above, it's the "65" shown storming up a 16% grade with 19-ton payload. Compare how Payhauler grade-ability speeds the cycle over other haulers!

In minimum shovel time you heap-load the big-target Payhauler body. Rugged corrugations absorb rock-shock—give high resistance to wear and distortion from abrasion and impact! Torque - cushioning planetary-type axles let you apply full power to start and haul full loads!

Add up the capacity-boosting advantages of Payhauler power-to-payload *punch*—super-speedy Payhauler loading, hauling and dumping. See how either the 19-ton "65" or 27-ton "95" can give you gear-faster climb-outs—and haul up to 14% faster than other rear-dumps! See your International Construction Equipment Distributor for a demonstration!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* Yours for the asking from your International Construction Equipment Distributor!

Get 11-second Payhauler dumping with exclusive, action-speeding inverted hoist design! Simple, easy-to-operate up-and-down snubbing control prevents machine-punishing impact! Fast reverse, up to 7.1 mph., speeds spotting to dump or load!

International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

A. E. ENGELMAN has been appointed technical service engineer for the Wisconsin Division, Huron Portland Cement Company. His services will be available to all customers in Wisconsin and Michigan (upper peninsula) for assistance in cement and concrete problems.

J. E. Taylor

A sequence of promotions has been made affecting personnel in the Central Sales Region of Universal Atlas Cement Division of U. S. Steel Corporation. It was announced that all appointments were effective March 1, 1960.

JAMES E. TAYLOR, sales manager, Illinois Sales District, has become assistant to the vice-president, General Sales Division, at headquarters in New York City.

WENDELL R. DOOLITTLE JR., sales manager, Metropolitan Chicago district, was appointed manager of sales, Central Sales Region, succeeding the late Frank J. Whitman.

W. R. Doolittle

Auwell Fogarty

AUWELL FOGARTY, sales manager, Indiana-Michigan Sales District, was named sales manager, Metropolitan Chicago Sales District, succeeding Mr. Doolittle.

ROY D. HOLLOWAY, assistant sales manager, was appointed sales manager, Illinois Sales District.

EDWARD J. LONERGAN, salesman, Illinois territory, was named assistant sales manager.

CHARLES E. NEWTON, assistant sales manager, is now sales manager, Indiana-Michigan Sales District.

EUGENE J. DWYER, who has been salesman in the Metropolitan Chicago territory, became assistant sales manager.

JOHN B. MOSS has been appointed manager of Bestwall Gypsum Company's Grand Rapids, Mich., plant. He succeeds A. H. TEN ELSHOFF, who is now working on special assignments.

Three men have been named to newly created and financial posts in the Alpha Portland Cement Co., Easton, Pa. JAMES I. MAGUIRE has been appointed director of management services; VICTOR W. ANCKAITIS, director of property management; and ROBERT E. HARTMANN, controller.

Mr. Maguire started with Alpha in the purchasing department in in 1949, became eastern division purchasing agent in 1952 and purchasing agent in 1958. Mr. Anckaitis joined Alpha in 1951 as a construction engineer. Mr. Hartmann had been assistant to the treasurer since joining the company in 1958.

JOHN L. FREEMAN has been named sales representative in central Illinois for Marquette Cement Manufacturing Company. CARL FOX, who has represented Marquette in this area for 15 years, is retiring because of ill health.

ANGUS E. HARNEY has been promoted to the position of sales manager of the newly formed Wisconsin division of Huron Portland Cement Company.

CHARLES A. BOY, assistant manager, Chicago office, of the National Gypsum Company, has been named Milwaukee (Wis.) district manager for the firm. He succeeds JAMES J. MYERS, recently promoted to a new post of dry-wall sales consultant at headquarters in Buffalo, N.Y.

C. E. HEDRICK, assistant sales director of the Florida Portland Cement Division of the General Portland Cement Company, has been named sales director.

ATLAS
MODEL 24
BELT CONVEYOR

NEW IMPROVED DESIGN GIVES YOU

- PRE-ENGINEERED DESIGN
- PRE-FABRICATED SECTIONS
- STANDARDIZED COMPONENTS
- FACTORY ASSEMBLED OR KNOCKED DOWN SECTIONS
- QUICK SHIPMENT
- FAST, LOW COST ERECTION
- LOW OPERATING COSTS

Write for Bulletin 24A

Model 24 Stationary Belt Conveyors are available for 18" through 48" belt widths with 24" and 42" deep truss frames. Designed for handling gravel, sand, stone, rock, slag, coal, ore and other bulk materials . . . the new Model 24 design provides greater capacity output and lower input power consumption.

When dependable conveying and loading equipment is needed, be wise — ask for Atlas.

See Your ATLAS Distributor or Contact

ATLAS CONVEYOR CO., CLINTONVILLE, WISCONSIN, U.S.A.

Manufacturers of portable and stationary conveyors and bucket elevators for handling loose material such as sand, gravel, crushed stone, coal, coke, cement, etc.

Enter 156 on card, page 197

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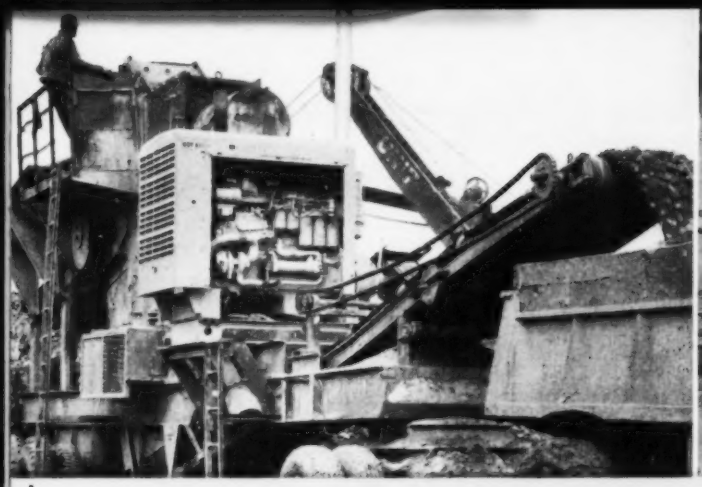
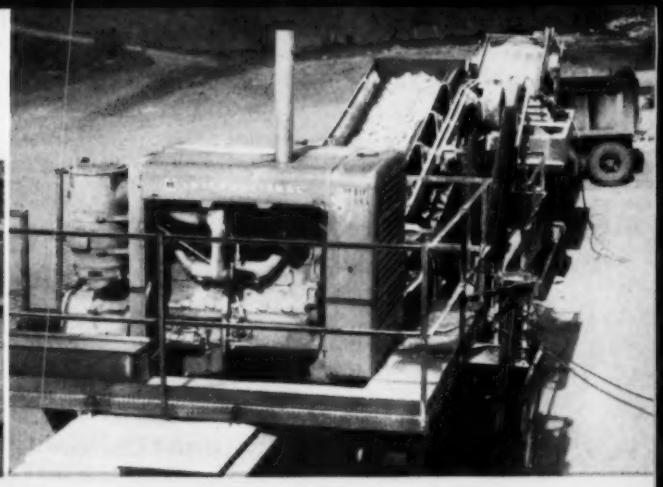


Roy Baker, of Valley Falls, Kans., got 20,000 hours of trouble-free performance from his original IH diesel before replacing it with a new UDT-817. Other reasons for choosing International were easy installation, direct starting and superior sealing. "Fuel consumption on the 817 is low, and with all that power we can eliminate secondary crushing by just reducing the jaw opening," say the Baker Brothers.



Eugene Nelson of Madison Stone Construction Co., in Wisconsin, got this contract off to a fast start with UDT-817 power. "Our profit depended on continuous high production," he reports. "We aimed at 180 tons per hour, but have been able to load out over 200 tons per hour! Specs called for crushing the hard Niagara limestone to minus one inch. We needed more power in a smaller unit and this UDT-817 fills the bill."

International UDT-817 gives you best power for BIG CRUSHING JOBS—Here's proof...

The heaviest crushing jobs are easily handled by this rugged International diesel. Field reports, like those shown here, prove big savings result when your crushing plant is powered by a UDT-817. Here's why...1) The UDT-817 develops 385 max. hp to lead the field in its size class. 2) Specific fuel consumption of the UDT-817 is the lowest in its size class. 3) The UDT-817 is the lowest priced engine in dollars per horsepower in its size class.

While the new 385 hp UDT-817 diesel heads up the International engine line, you can choose from 31 other diesel and carbureted models ranging upward from 16.5 hp. Save on operating and repowering costs by checking with your International Engine Distributor or Dealer, or by specifying dependable International power in new machines. All 32 engines have one common feature: fastest payback power for users.

The West Texas Construction Co. of Lubbock, is crushing caliche at 300 tons per hour with UDT-817 diesel power. The rock is crushed to minus $1\frac{3}{4}$ inch. Limited by feeder capacity, the big, new International delivers only 265 continuous hp @ 1,800 rpm.—that's power to spare! Other IH power on this job includes a carbureted U-264 engine on the feeder, and a UD-18A diesel on the air compressor.

INTERNATIONAL®

ENGINES

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
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WILLIAM C. KNAPP was elected vice-president, financial and accounting, for the Arundel Corporation, Baltimore, Md. He has been associated with the firm since 1943, and served most recently as vice-president-controller. He is also a director and controller of the Maryland Slag Company.

At the same time, the election of C. EDGAR FISHEL as controller was announced. All other officers of the corporation were re-elected.

C. JOHN WACHTER JR. has joined Alpha Portland Cement Company as a sales representative in central Pennsylvania. Before joining Alpha, he was affiliated with J. Robert Bazley, Inc., of Pottsville, Pa., and more recently with H. J. Williams Co., Inc., of York, Pa.

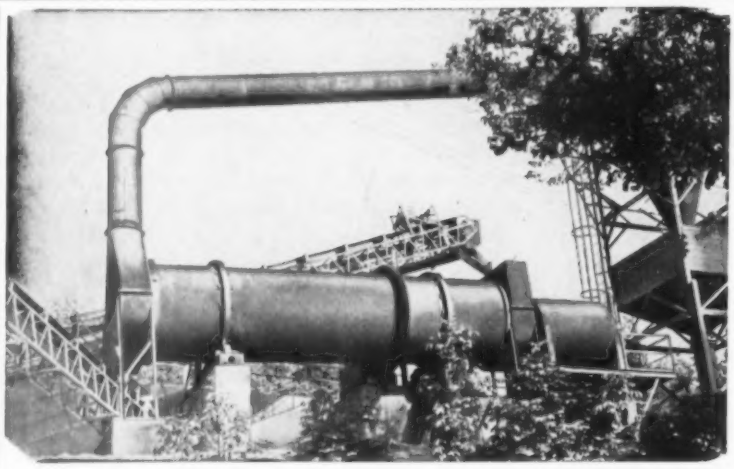
The promotion of RALPH E. FRANK to the new position of general products manager for National Gypsum Company has been announced. Mr. Frank joined National Gypsum in 1932 and has advanced in the company through several positions.

JAY P. NICELY has been promoted to the position of dealer sales manager for the National Gypsum Company. He was formerly Midwest Division sales manager for the firm.

JOHN P. HAYES has been named to succeed Mr. Nicely in his former post as manager of National Gypsum's Midwest Sales Division.

GEORGE W. MINTZ has been named manager of the eastern district of the Michigan Limestone Division of U. S. Steel Corporation. He will continue in his post as manager of the Lake Erie district, which includes processing plants in Buffalo and Conneaut, Ohio.

The eastern district, covering quarries in Pennsylvania and West Virginia, had been managed by J. N. SULIOT, who was promoted to the post of manager of the northern district in Rogers City, Mich.



DRYERS • COOLERS • KILNS

This 7 ft. x 30 ft. Rotary Dryer removes excess moisture. Dryer is oil heated.

Over 60 years of experience and a thorough knowledge of raw materials and their properties have resulted in McDermott's ability to design and build for you the most efficient equipment for your specific needs. You'll save money on initial installation costs . . . and, more important, on maintenance costs.

write for free brochure
12 pages of diagrams, descriptions and on-the-job photographs to illustrate the scope of our work.

McDermott

BROTHERS CO., Inc.
Allentown, Penna.
HEmlock 3-3231

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Obituaries

DONALD MEEK, 72, senior vice-president of Pacific Cement and Aggregates, Inc., San Francisco, died recently after a short illness. He had been active in the building trades since 1906, when he entered the sand and gravel business with the old Natomas Company in the Sacramento Valley. In 1936 he became general sales manager of the newly merged Pacific Cement and Aggregate, and in 1953 was named senior vice-president of the firm.

WILLIAM A. CAVANAUGH, 68, former sales manager and vice-president of the Buffalo Crushed Stone Corporation, Buffalo, N. Y., died on May 8 in a hospital in Boynton Beach, Fla. He had moved to Boca Raton after retiring 19 months ago.

CHARLES T. D. ATKINSON, retired manager of the Piedmont plant of Georgia Marble Company, Tate, Ga., died recently at the age of 89.

Mr. Atkinson was born and educated in England and emigrated to Canada as a young man to work on the Canadian Pacific Railroad. Later he went to Mexico City, where he was affiliated with the Portland Cement Company. In 1924 he went to Marble Hill, Ga., to become plant manager for the Georgia Marble Co.

CHARLES A. BALDUS, 73, associated for 46 years with the San Antonio (Tex.) Portland Cement Company, died recently in that city.

CHESTER C. SLIDER, who was president of the E. T. Slider Company of New Albany, Ky., and vice-president of the E. T. Slider Company of Louisville, Ky., before his retirement, died recently in St. Petersburg, Fla. The two firms, which produced sand and gravel and coal, were founded by Mr. Slider's father.

OWNERS REPORT:

How exclusive clam-action 4-in-1 MAKES MONEY where other rigs don't!

"4-in-1 break-out action saves time and shooting costs"

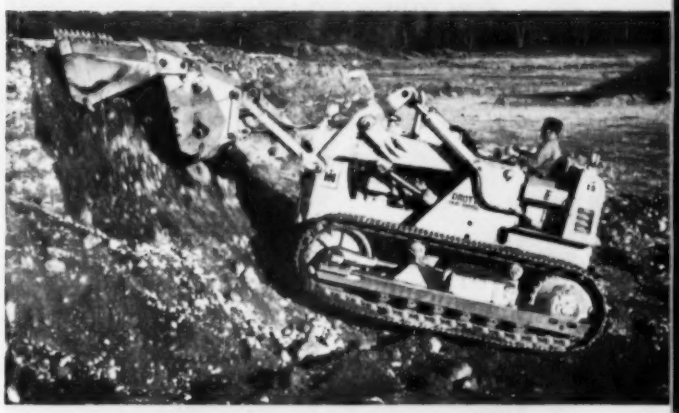
—Albert Boehman Coal Mine, St. Meinard, Indiana

Albert Boehman Coal Mine uses an International Drott TD-6 Four-in-One to strip overburden, clean the vein, and load out coal. "I particularly like the 4-in-1's (pry-over-shoe) break-out action which heap-loads the bucket fast, and usually saves 'shooting' costs. The 4-in-1 has the work-producing features of several machines in one." *Here his TD-6 Four-in-One is "digging coal" directly from the vein it uncovered and cleaned.* The 1⅛ cu. yd. TD-6 can apply a tremendous 18,600 lbs. of break-out force!

"Bottom-dumping 4-in-1 cleans itself out"

—Marion Young, Bloomington, Indiana

"I tried another rig for a month and had to clean out its bucket with a spade—and that slows you down with 600 to 700 lbs. of dirt stuck in it," states excavating-loading contractor Marion Young. "My bottom-dumping 4-in-1 cleans itself out when I flap the clam (hydraulically)." Here his 4-in-1 is loading wet river-bottom gravel. Exclusive 4-in-1 bottom-dumping eliminates the sticky materials problem!



"Our 4-in-1 replaces several other rigs"

—Joseph Borge & Sons, Inc., Swansea, Mass.

Joseph Borge & Sons, Inc., produce washed sand and gravel from open pits—use their TD-15 Four-in-One to strip overburden, load out, and recontour worked-out pits. Owner reports loading out 1,200-1,800 tons of material per 8 hrs. "Four-in-One versatility and capacity replace several rigs for us," states Vice-president, George Borge. "The clam-action also digs faster and dumps cleaner." Above, their 4-in-1 is "back-dragging" from gravel bank, to speed loading.

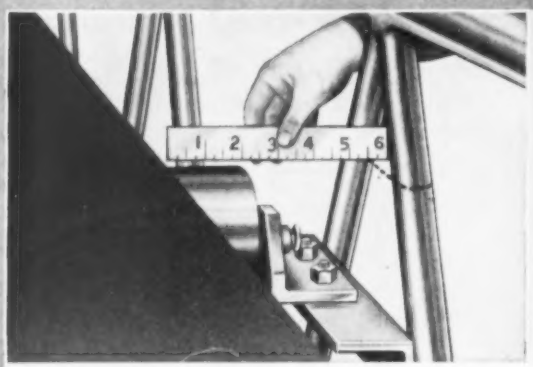
Why limit your income to what an old-style, single-action loader, or any other limited-duty rig can earn you? See how an International Drott 4-in-1 can give you a whole equipment spread of actions—and each action can double for one or more costly specialized machines. Prove Hydro-Spring performance protection. See your International Drott Distributor for a 4-in-1 demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

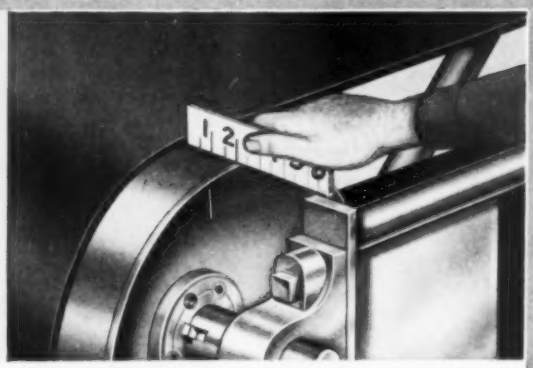
INTERNATIONAL® DROTT®

REDUCE BELT COSTS WITH MARCO TUBULAR FRAME CONVEYORS

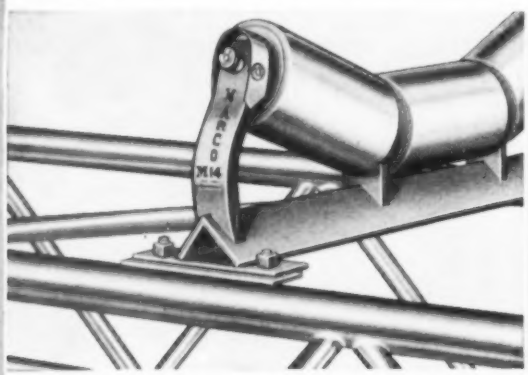
Exclusive conveyor features increase belt life by offering maximum protection against edge damage



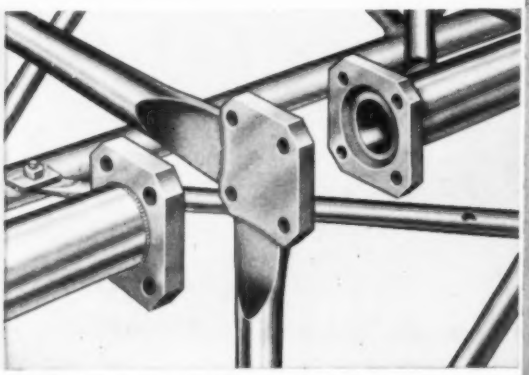
WIDER FRAME—MARCO Tubular Frames are widest in the industry. They provide 100% more space (5½") in the critical area—between belt edge and nearest frame member. Pedestal type return idler brackets are used, instead of hanger brackets that confine and damage belt.



WIDER FACE PULLEYS—MARCO is first with modern pulley specifications. 2" between belt and pulley edge—provides 100% greater protection than outmoded standards. Reduces possibility of belt destruction caused by "belt wandering" in high tension areas.



ALL TUBULAR MEMBERS—MARCO Tubular Frames are more rigid. Constructed of the strongest known structural member, these frames are modern—and resist material and water build-up. Sharp "belt cutting" edges are eliminated with this exclusive construction.



RIGID JOINT CONSTRUCTION—Another MARCO exclusive—4 bolts in each connection—16 in each joint. Not the usual 1 or 2 per connection. Joints are more rigid. Resists frame misalignment, simplifying belt training and increasing belt life.

Now, more than ever, conveyor belt represents the largest major repair or replacement expense in a conveyor installation. Realizing the extreme importance of this fact, MARCO has designed every conceivable belt saving idea into its Tubular Frame Conveyors.

MARCO is first to have all 4 of these proven belt protection features: a wider frame, wider face pulleys, all tubular members and the most rigid joint construction.

If wind, uneven loading, or factors beyond control should cause "belt-wandering", this exclusive conveyor design offers the operator the finest, most complete protection against belt "edge damage".

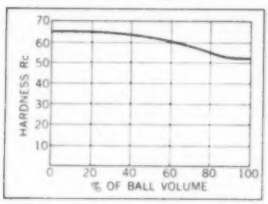
Increasing belt life by reducing belt "edge damage" is only one of the cost saving advantages in MARCO Tubular Frame Conveyors. Remember, your conveyors are not mere plant accessories—they deserve the attention of a specialized manufacturer offering modern specifications, carefully and properly designed to meet your most exacting requirements. For more information consult your MARCO Distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Missouri.

MARCO* **engineered MARCO products:**

Tubular Frame Belt Conveyors Conveyor Idlers Solid and Self Cleaning Steel Pulleys
Bucket Elevators Control Gates Feeders Bins

*Trademark Reg.

Immediate delivery on USS Grinding Balls We swing into action immediately when you order USS Grinding Balls. Thus, they are delivered to you when you need them. We can ship promptly from stock that includes a complete range of sizes from ¾″ to 4″ in USS Carbon-Manganese Steel and USS Alloy Steel. Here are three reasons why USS Grinding Balls are your best buy: **Maximum hardness** combined with superior toughness. **Deeper hardness penetration** achieved by careful combination of heat treatment and composition. **Uniform roundness** from ball to ball, load to load, for less wear and superior performance. If you have a delivery, performance, or selection problem, call our nearest Sales Office or United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.



USS is a registered trademark

This mark tells you a product is made of modern Steel

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Export Company
United States Steel

Manufacturers' News

The proposed merger of Barber-Greene Company, Aurora, Ill., and Smith Engineering Works, Milwaukee, Wis., was announced by the boards of directors of the two companies. The merger is to be based on an exchange of common stock—six shares of Barber-Greene for each share of Smith Engineering.

Under the proposed plan, the merged company will operate under the name of Barber-Greene Company, under its present officers, with the addition of GERALD L. SMITH and DONALD D. BARNES as vice presidents and members of the board of directors. Smith Engineering will operate, under its present management, as a division of Barber-Greene. Mr. Smith will be president, and Mr. Barnes will be executive vice-president of the Smith Engineering Works Division.

The Thew Shovel Company has announced the appointment of J. D. ZOOK as manager, product development department, to fill the vacancy created by the retirement of QUINCY J. WINSOR.

J. D. Zook

T. C. Braucht

T. C. (TED) BRAUCHT has been appointed district manager of the southern district for Rankin Manufacturing Company, Alhambra, Calif. He will make his headquarters in the Dallas-Fort Worth area, and will be available for consultation and direct field assistance for customers desiring help with hard-surfacing problems and applications of all types.

The service department of Euclid Division of General Motors is offering service training which is being scheduled through the month of October. Courses on crawler tractors, rear-dump trucks, and overhung scrapers are being given at the school in Cleveland, Ohio. Euclid dealers have complete information, and will assist in making living and travel arrangements for those interested.

The training will combine lectures with step-by-step component teardown, to give students procedures in preventive maintenance, overhaul, and repair.

THOMAS B. APPLEWHITE has been named manager of conveyor products sales for United States Rubber Company, New York, N. Y., He succeeds ROBERT E. SPOERL, who has resigned.

HUGH J. HUSH, president of the Griffin Equipment Company and the Griffin Wellpoint Corporation, died as a result of a heart attack while vacationing in Florida in March. Mr. Hush had been president of the Associated Equipment Distributors in 1952, and had been in the construction equipment business for 32 years.

Kaiser Refractories & Chemicals Division has announced that the names of three of its sales subsidiaries have been changed to the name of the parent organization.

The Mexico Refractories Company of Ohio, in Toledo, will now operate under the name of Kaiser Refractories & Chemicals. ROBERT ARTMAN and WILL COMBS will continue to serve as district sales managers respectively.

A similar change has been made by the Mexico Refractories Company of Texas, with offices in Houston and Dallas. District headquarters will remain at Houston, with L. L. BRIGHTMAN as manager.

In Los Angeles, the Missouri Refractories Company has also changed its name to Kaiser Refractories & Chemicals. W. E. DAUGHERTY will serve as district sales manager. This office will remain in Vernon, Calif.

At the same time, Kaiser Refractories has announced the opening of a new sales office in Columbus, Ohio, where GLEN (DOC) AMES will serve as sales representative reporting to the Toledo district office.

All offices will handle the complete line of refractory materials including clay, silica, magnesia, and a wide variety of refractory specialties.

RICHARD G. WHITLOCK has been promoted to assistant sales manager of The W. W. Sly Manufacturing Co., Cleveland, Ohio. Previously, he was engineering service manager for the Cleveland manufacturer of dust control systems, industrial ovens, and blast-cleaning equipment.

R. G. Whitlock

T. J. McNeil

THOMAS J. MCNEIL has been appointed New York district manager for the Eimco Tractor Division of The Eimco Corporation, Salt Lake City, Utah. Mr. McNeil joined Eimco in 1959 and was engaged in marketing development work. His territory includes the northeastern United States.

PHILIP M. DIXON has been appointed branch manager of the Detroit office of Peerless Pump, Hydrodynamics Division, Food Machinery and Chemical Corporation. Except for service in the Navy, Mr. Dixon has been with Peerless since 1941.

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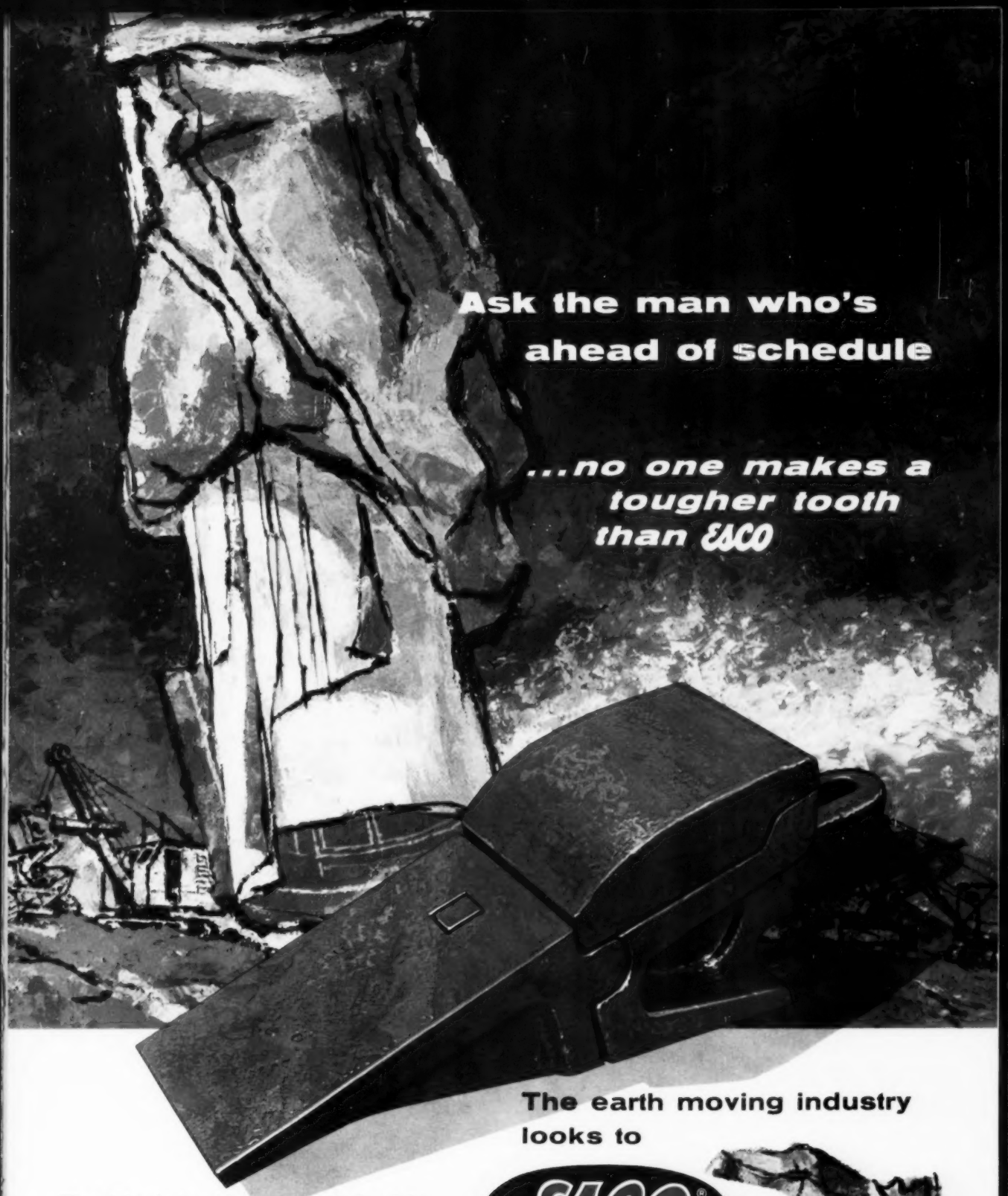


The right design, the right steel, the right shape make *ESCO* Two Piece Teeth right for every digging condition.

The earth moving industry looks to

ESCO®

Electric Steel Foundry Co., PORTLAND, OREGON

See reverse for shapes and size range

Here are the points to remember...

Each easy-to-change *ESCO* Point is Brinell tested to assure exactly the right degree of shock-absorbing toughness and abrasion-resisting hardness for longer life.

12M ALLOY STEEL

ESCO 12M Two Piece Teeth are the toughest you can use. Developed through years of research for the earth moving industry, cast *ESCO* 12M is the finest steel made for severe shock and abrasion.

ESCO TWO PIECE TEETH

for all your digging equipment

Your *ESCO* dealer can supply two piece teeth for all your equipment. Consult him about standardizing on *ESCO* teeth for the added advantages of quality purchasing and reduction of on-the-job inventories.

8 POINT TYPES
FOR EVERY DIGGING CONDITION

WEAR CAP ADAPTERS

The ESCO Wear Cap Adapter, winner of the Blue Ribbon Mining Award, is the most rugged tooth assembly ever developed for handling tough rock and taconite. Replaceable wear caps sharply increase service life by protecting the adapter from wear. No special pins or welding required.

GENERAL PURPOSE | ROCK | ROCK PICK | PICK | SHARP FLARED | SHARP | SHARP LONG | RIPPER

Electric Steel Foundry Company
2159 N. W. 25TH AVE. • PORTLAND 10, OREGON

MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
ESCO INTERNATIONAL, NEW YORK, N. Y. • IN CANADA ESCO LIMITED

ESCO®

LITHO IN U.S.A.

Advancement of three employees at Hyster Company's Danville, Ill., factory has been announced.

DON LONGER, personnel manager for the last five years, has been named general foreman of Hyster's Danville Plant No. 2. Replacing Mr. Longer as personnel manager is JAMES STRADER, who moves up from a position in the personnel department.

AXEL NELSON was appointed general foreman in charge of all fabricating operations at Danville Plant No. 1.

ROBERT HENDERSON has been appointed chief engineer of Hyster-Sonnerdale Ltd., distributing organization for Hyster industrial trucks and tractor equipment manufactured in Australia. Mr. Henderson was transferred from Portland, Oreg., where he had been a member of the company's Special Products Engineering department.

J. O. QUAMME has been assigned regional sales manager of a seven-state region, with headquarters in Dallas, Tex., for Dayton Industrial Products Company, Melrose Park, Ill. He had previously been industrial hose product manager for Dayton.

Dayton has also announced the appointment of RALPH H. VANCE JR. as sales engineer, handling the company's line of industrial V-belts, sheaves, industrial hose, and related items in the Cincinnati, Ohio, sales region.

CHARLES H. SOMMER was recently elected president of Monsanto Chemical Company, and CHARLES ALLEN THOMAS was elected chairman of the board of directors.

DENNIS P. SHANAHAN will be district manager of the new office established at Denver, Colo., by Harnischfeger Corporation, Milwaukee, Wis. Mr. Shanahan, who has been transferred from the Baltimore area, will work with dealers in Colorado, Utah, New Mexico, Arizona, Wyoming, and the Panhandle area of Texas.

JOSEPH A. WIENDL has been appointed general manager of sales for Ingersoll-Rand Company, New York, N. Y. Prior to this assignment Mr. Wiendl was assistant general manager of sales. He has been with the company since 1941.

J. A. Wiendl

S. Bunish

STEVEN BUNISH has been appointed to the position of manager, portable cable sales, for Anaconda Wire & Cable Company, New York, N. Y. Mr. Bunish joined the company in 1942. He has spent much of his time with the company on research and development of mining and portable cable.

Denver Equipment Company of Denver, Colo., has announced the appointment of the Jasper Engineering & Equipment Company of Hibbing, Minn., as sales representative on the Minnesota iron range.

DWIGHT JAMAR, president of Jasper Engineering & Equipment Company, stated that his firm will be able to give on-the-spot sales and service for Denver SRL pumps and Denver samplers, as well as sales and technical assistance on Denver thickeners, filters, and other items.

J. WILLIAM HINKLEY has been elected president of Research-Cottrell, Incorporated, Bound Brook, N. J., following the resignation due to illness of JAMES M. KNOX. Mr. Knox has been elected vice-chairman of the board of directors of Research-Cottrell.

Mr. Hinkley is also president of Research Corporation, a foundation to provide means for scientific investigation. Research-Cottrell, Inc., is a wholly owned subsidiary of the foundation.

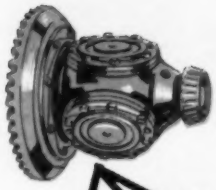
The directors of The Tool Steel Gear and Pinion Company, Cincinnati, Ohio, have announced the appointment of HAROLD S. MERCIER, formerly general sales manager, to the post of vice-president in charge of sales. Mr. Mercier has been associated with Tool Steel for the last seven years.

Succeeding Mr. Mercier as general sales manager will be R. L. MCGRATH, formerly assistant general sales manager.

The Chicago offices of the Traylor Engineering and Manufacturing Division of Fuller Company moved to a new address recently. The firm's Chicago offices henceforth will be 3909 Field Building, 135 LaSalle Street. The Fuller Company and the General American Transportation Corporation also have offices at the same address.

The new office will continue to be under the management of JESSE L. WEDDLE JR. and will serve a 23-state Midwest area.

LESCHEN WIRE PORTER ROPE DIVISION
H. K. PORTER COMPANY, INC.
Enter 165 on card, page 197

TRACTION MAGIC  with

ROLLS OUT OF

KON-TORK differential automatically applies power to the driving wheel with firmest footing . . . moves the 230-hp Allis-Chalmers TR-260 through the toughest going.

In mud, sand or other slippery going, you can rely on the Allis-Chalmers TR-260 to move you out of trouble. KON-TORK differential automatically controls the amount of torque delivered to each driving wheel. When one wheel hits soft going, KON-TORK takes hold and transfers torque from the slipping wheel to the wheel with solid footing . . . keeps the 20-ton capacity TR-260 on-the-go. With KON-TORK, normal and complete steering control is available at all times.

KON-TORK differential is just one of many features you'll like in the TR-260. You'll also appreciate the *21-inch underclearance at the tractor*, and *25¾-inch wagon*

Enter 166 on card, page 197

. . . move ahead with

KON-TORK DIFFERENTIAL

KON-TORK is an Allis-Chalmers trademark.

TROUBLE

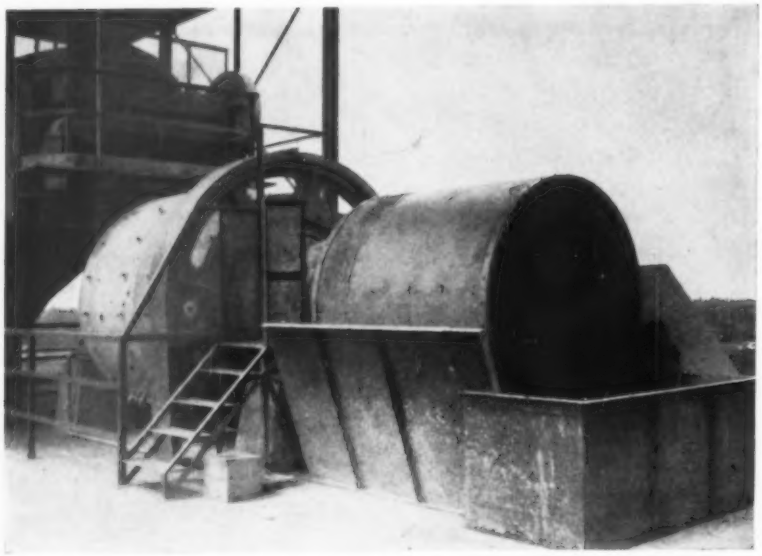
underclearance that prevents hang-ups in rough terrain, and the *really sharp 180-degree turns in less than 26½ feet* . . . unmatched by conventional haulers.

Let your Allis-Chalmers dealer give you all the facts on the 20-ton capacity TR-260 and the 12-ton capacity TR-160. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

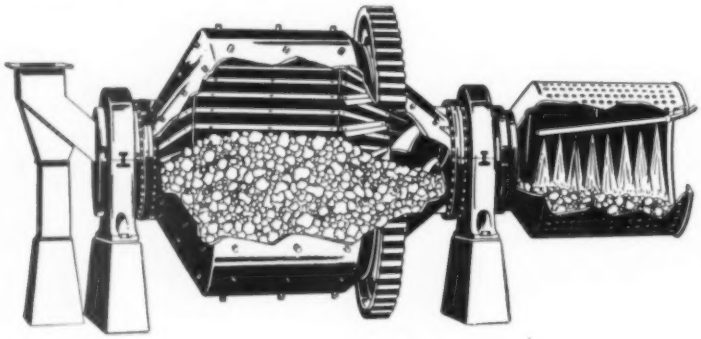
You get double value and lower basic equipment investment when you use the 9.5-cu-yd TS-160 and 17-cu-yd TS-260, the 12-ton TR-160 and 20-ton capacity TR-260. Both can be interchanged . . . together they eliminate need for specialized equipment.

ALLIS-CHALMERS . . . power for a growing world

HARDINGE SCRUBBERS FOR PIT-RUN MATERIALS



The 8′ x 48″ Hardinge Conical Scrubber, above, with 6′ x 6′ dewatering screen kept a west coast sand and gravel plant in business, after their high grade deposit was exhausted—successfully removing large quantities of extremely sticky clay from their quarry stone. Hardinge Conical Scrubbers are in operation throughout the country, cleaning crude iron ore, sand, dolomite, river gravel, and crushed stone of all types.



Large diameter, short length trunnions permit chute feeding of unsized ore and rock at rates up to 600 tons per hour.
The mass loading and ball-mill action in the scrubber quickly and completely slurries the clay and dirt, permitting ready separation in washing screens or trommels.

Write for Bulletin 37-B-8

HARDINGE
COMPANY, INCORPORATED
YORK, PENNSYLVANIA · 240 ARCH ST. · Main Office and Works
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco • Birmingham • Lakeland
Enter 168 on card, page 197

Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio, announces the appointment of Tri-County Contractors Supply, Incorporated, West Springfield, Mass., as distributor for Lima Austin-Western crushing, screening, and washing equipment. This territory covers five counties in Massachusetts.

WILLIAM G. NELSON was appointed southwestern sales representative of Columbia Steel Casting Company, Incorporated, of Portland, Oreg.

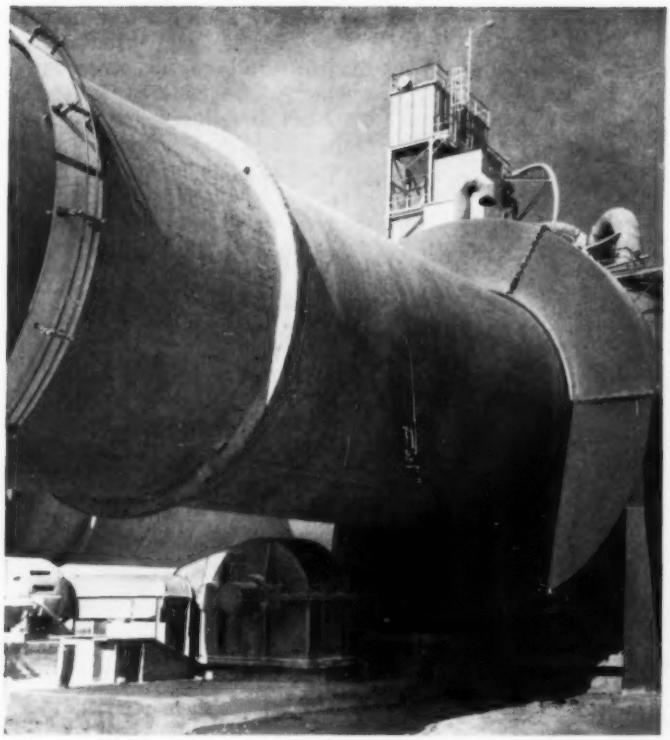
Mr. Nelson, headquartering in Los Angeles, will serve central and southern California, western Nevada, Arizona, New Mexico, and west Texas.

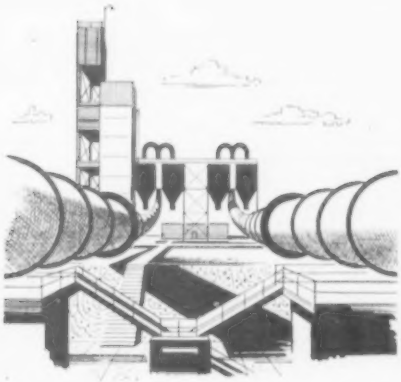
An announcement was made of the termination of an agreement under which The Stearns-Roger Manufacturing Company served as sales agent for The Babcock & Wilcox Company's refractories division in a number of western states.

HARVEY SHANK has been appointed manager of Ehrsam Pacific in San Francisco, the west coast subsidiary of The J. B. Ehrsam & Sons Manufacturing Company. Mr. Shank will be responsible for sales of Ehrsam material-handling equipment in California, Washington, Oregon, Nevada, Idaho, and western Montana.

WILLIAM C. THOMAS, the former manager of Ehrsam Pacific, has been transferred to Atlanta, Georgia, where he will assume his duties as southeastern district manager for the Ehrsam Co. Mr. Thomas will be responsible for sales in Georgia, Kentucky, West Virginia, North Carolina, South Carolina, Mississippi, Alabama, and Florida.

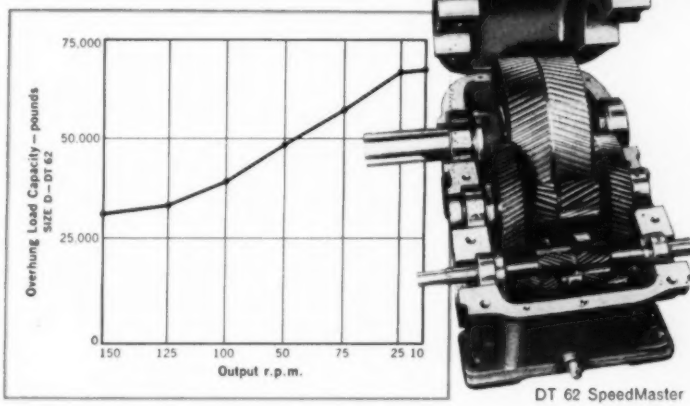
PAUL M. WHATLEY has been appointed to the position of branch office manager of the new office in Birmingham, Ala., established as part of The Master Builders Company expansion in the Southeast.





At a cost of 3.2 million dollars, Riverside Cement recently expanded its Oro Grande plant to increase clinker capacity by one million barrels annually. To achieve this, 5 smaller kilns were replaced with two 12′ x 310′ Allis-Chalmers rotary kilns. Western Gear SpeedMaster DT 62 parallel shaft speed reducers, driving these kilns, will help do the job.

on the long run...



DT 62 SpeedMaster

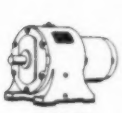
QUALITY COSTS YOU LESS!

Dynamic peaks from non-uniform loading such as with kiln drives, and heavy overhung load demands are common requirements for the SpeedMaster. Check the overhung load capacity of this DT 62 on the curve to the left to see for yourself one good reason why the SpeedMaster is a familiar sight on such key drives where operation is vital. Heavy overhung load capacity is a standard feature on every unit.

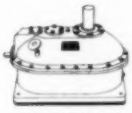
The DT 62 SpeedMasters are rated at 156 hp, AGMA Class I, with a ratio of 80.08 to 1 and an input speed of 1200 r.p.m. Auxiliary drives use two Western Gear BH 109 spiral bevel units rated at 16.3 hp, AGMA Class I, with a 17.23 to 1 ratio and an input speed of 1500 r.p.m.

WG INDUSTRIAL PRODUCTS DIVISION

OTHER WESTERN GEAR POWER TRANSMISSION PRODUCTS


INTEGRAL GEARMOTOR

PARALLEL SHAFT REDUCER


VERTICAL SHAFT REDUCER

HIGH SPEED UNIT

RIGHT ANGLE REDUCER

WESTERN GEAR CORPORATION
Industrial Products Division
P.O. Box 126, Belmont, California

Please send me SpeedMaster Bulletin 5802

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____

Marion rock bodies are BUILT TO TAKE IT!

Fleet of Marions On The Job Regularly Since 1954 Provide Top Payload Performance With Minimum Downtime At Indiana Quarry

Seven Marions—two in service since 1948 and five since 1954—have been giving their owners top payload performance with minimum downtime.

Each unit hauls about 280 tons per day in 35 trips from the quarry to the crusher. The bodies are RB-50s, 5 cubic yards, with sideboards. The double arm underbody hoists are HD-8s.

Other Marion equipment in use at this ultra-modern quarry includes 5 trailer dumps, 5 tandem axle and 5 single axle units. The owners also use Marion equipment exclusively at their other two operations—a quarry and a coal mine.

If you want more information about how rugged Marion rock bodies and heavy duty hoists can help your quarry operation, write direct or see your Marion Distributor.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

Enter 170 on card, page 197

J. V. S. NORTON has been named eastern regional sales manager for Bucyrus-Erie Company, South Milwaukee, Wis., to succeed F. LESLIE JONES, who retired recently. Mr. Norton, who had previously been assistant sales manager, eastern region, will continue to work out of the New York office.

J. V. S. Norton

B. P. Colosky

BENJAMIN P. COLOSKY is heading the newly established technical services department at Corhart Refractories Company, Louisville, Ky. He served as a member of Rutgers University faculty before joining Corhart in 1957. The purpose of the new department is to provide assistance to customers having technical problems in specifications. Mr. Colosky will also be responsible for market and product development.

JERRY MCEVILLY has been appointed field representative for the Arcair Company in the Chicago area. His territory will include nine Midwestern states.

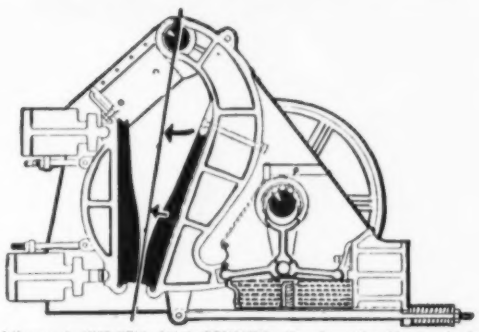
Before joining the Arcair Company, Mr. McEvilly worked for several national firms in a welding supervisory capacity, both in this country and abroad.

E. E. WESTERBACK has been named Southeast Region sales manager of International Harvester Company's Construction Equipment Division. Formerly territory manager at Oakland, Calif., Mr. Westerback succeeds E. L. BOUGHTON, who is handling a special assignment.

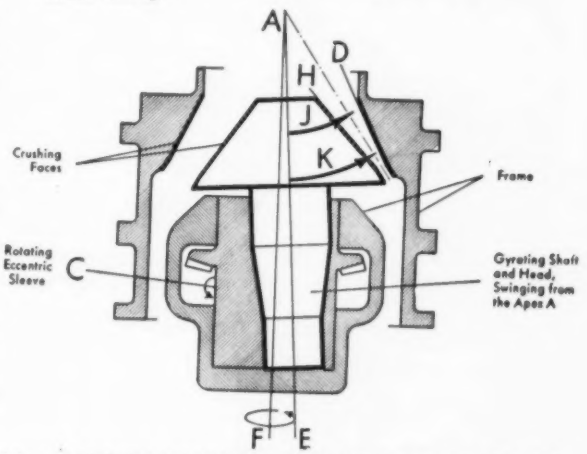
ROLAND B. KOIVISTO, territory manager formerly headquartered at St. Paul, has been transferred to Oakland to replace Mr. Westerback.

KUE-KEN® jaw plates and liners average full year of service on abrasive quartz by crushing without rubbing

5 times longer jaw plate life in over 6 years of continuous crushing of abrasive quartz has resulted in lowest cost-per-ton crushing for Joe Chevereaux in his Auburn, California, rock plant. With a plant capacity of 250 tph, the 6 x 16 KUE-KEN jaw crusher has operated continuously since 1953 with only six jaw plate replacements. The 28″ KUE-KEN gyratory installed in 1958 and fed at a rate of 30 tons per hour has required only a single liner replacement to date. This profitable performance is attributable to the patented KUE-KEN crushing principle that eliminates rubbing — the main cause of premature jaw plate and liner wear. Additional savings result from lower power consumption: power is used to crush rock, not to wear out jaw plates. The KUE-KEN sealed, dust-tight lubrication system with all mechanism operating in filtered oil permits higher speeds for greater capacity and a more uniform product. Crusher wear is negligible and shut-downs common to conventional machines are practically eliminated. Automatic flywheel release prevents breakage from tramp iron. Especially for hard rock crushing, the lowest cost production is assured with KUE-KEN jaw and gyratory crushers.



(diagram) KUE-KEN JAW CRUSHER. See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.



(diagram) KUE-KEN GYRATORY CRUSHERS. See how crushing faces pass through crushing zones on arcs J and K to crush rock squarely without rubbing.

KUE-KEN® CRUSHERS

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers
Revolving Screens · Classifiers · Feeders · Rib Cone Ball Mills
Concentrating Tables · Vibrating Screens

DEALERS:

SEATTLE, WASH. ..... Washington Machinery Co.
BUTTE, MONTANA ..... Hall-Perry Machinery Co.
VANCOUVER, B. C. ..... Universal Equipment Co.
SALT LAKE CITY, UTAH ..... Lund Machinery Co.
SAN ANTONIO, TEX. ..... Closner Equipment Co.
LOS ANGELES, CALIF. ..... Garlinghouse, Freman Co.
SAN FRANCISCO, CALIF. ..... Aggregate Engineers, Inc.
PORTLAND, OREGON ..... Air-Mac, Inc. of Oregon
BISMARCK, NORTH DAKOTA .... Midwest Equipment Co.
PHOENIX, ARIZ. ..... Road Machinery Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacture and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

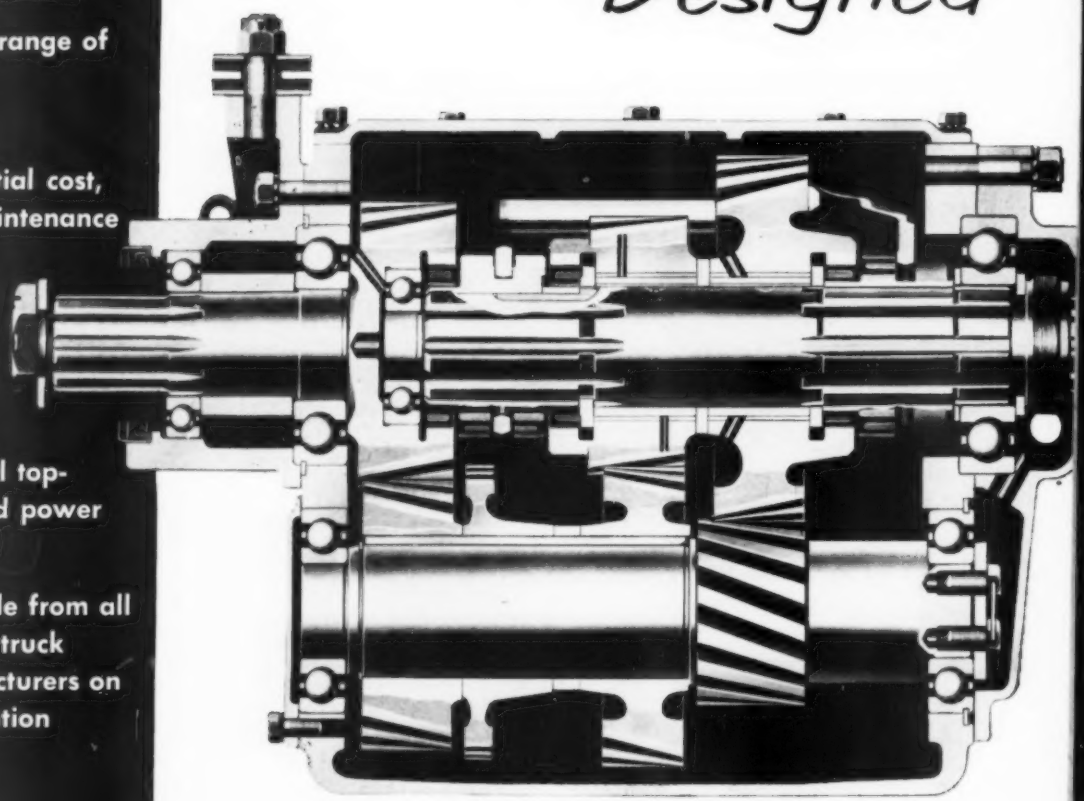
16 MODELS OF

Specify FULLER . . .

FULLER

Designed

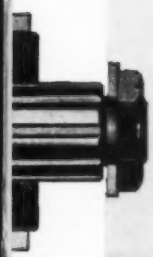
- High capacity
- Widest range of ratios
- Low initial cost, less maintenance
- Optional top-mounted power take-off
- Available from all leading truck manufacturers on specification



Specify the MODEL

3-SPEED AUXILIARY TRANSMISSIONS

for YOUR job!



For MEDIUM-HEAVY DUTY, specify the Fuller 65 Series 3-speed Auxiliary

65 Series: Ratios

MODEL	SPLITTER RATIOS High	SPLITTER RATIOS Inter-mediate	DEEP REDUCTION Low
3-A-65	.754	1.00	2.221
3-B-65	.804	1.00	1.239
3-C-65	.754	1.00	1.239
3-D-65	.804	1.00	2.221
3-E-65	.804	1.00	1.74
3-F-65	.754	1.00	1.74
3-G-65	1.00	1.32	2.221
3-H-65	1.00	1.32	1.74

For HEAVY DUTY, specify the Fuller 92 Series 3-speed Auxiliary

92 Series: Ratios

MODEL	SPLITTER RATIOS High	SPLITTER RATIOS Inter-mediate	DEEP REDUCTION Low
3-A-92	.74	1.00	2.09
3-B-92	.84	1.00	1.24
3-C-92	.75	1.00	2.64
3-D-92	.75	1.00	1.24
3-E-92	.84	1.00	2.09
3-F-92	.84	1.00	2.64
3-G-92	1.00	1.327	2.09
3-H-92	1.00	1.327	2.64

P.S. Fuller also offers three heavy-duty 3-speed Auxiliaries with built-in high-torque power take-off. Ask your dealer about the Fuller 3-T-92 Series Auxiliaries.

FULLER — TRANSMISSION DIVISION — MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla. Automotive Products Company, Ltd., Automotive House, Great Portland Street, London W.1, England, European Representative

The Harbison-Walker Refractories Company has opened a new western district sales district, with headquarters in Los Angeles, Calif. The office will be managed by C. F. WENRICH, a member of the Harbison-Walker sales staff since 1946.

The new western district consists of California below the northern boundaries of Inyo, Kern, and San Luis Obispo counties; all of Nevada south of the 37th parallel; the entire state of Arizona; and the state of Baja California in the Republic of Mexico.

Reorganization of its Processing Machinery Department with attendant realignment of product lines and the creation of new positions has been been announced by Allis-Chalmers Manufacturing Company, Milwaukee, Wisc., as follows:

FRANK E. BRIBER JR., assistant manager, Processing Machinery Department; C. E. BURNETT, manager, Pyro-Processing Section; J. K. GIBSON, sales manager, cement machinery; W. A. SHOCKLEY, sales manager, mineral processing machinery; GLENN HANSON, process development functions; and R. M. BLIEMEISTER, supervisory engineer, product engineering, pyro-processing machinery.

A. L. STEWART is appointed manager of the Crushing and Grinding Machinery Section; A. K. BOSZHARDT, sales manager, crushing machinery; C. A. ROWLAND, sales manager, grinding machinery; W. A. PATTERSON, supervisory engineer, product engineering, crushing machinery; E. J. KLOVERS, supervisory engineer, product engineering, grinding machinery.

J. E. FINK is appointed manager, Screening Machinery Section; M. P. HAHN, supervisory engineer, product engineering, screening machinery; H. D. VANDERLIP, manager, Chemical Processing and Food Machinery Section; K. W. BORGES, assistant chief draftsman and supervisory engineer, product engineering, chemical processing and food machinery; E. C. MERTZ, manager, Engineering Project Section, and D. L. F. WILSON, sales manager, Renewal Parts.

Olivier & Son, New Bedford, Mass., has been appointed sales and service representative to the Cape Cod Bay area for the truck equipment manufactured by the Daybrook Hydraulic Division of Young Spring & Wire Corporation, Bowling Green, Ohio.

Owens Body & Equipment Company, Casey, Ill., will be sales and service representative in southern Illinois for the same company.

Another distributor appointment is that of the Simmons Garage & Equipment Company, Lexington, Ky., serving the counties within the Lexington trading area.

JOHN SHARP III has been appointed supervisor of the electronic tabulating equipment at the New York Air Brake Company's Aurora (Ill.) Pump Division. He joined the company in 1952.

C. W. MOHME has been appointed to head the new Contract Engineering Division of Western Conveyor Company.

Mr. Mohme and his staff will provide a diversified consulting service for western industries in the initial planning or modification of operational plant systems, equipment, structures, and foundations. Mr. Mohme joined Western Conveyor about two years ago as chief engineer.

Several changes have been made in the organization of Chain Belt Company, Milwaukee, Wis.

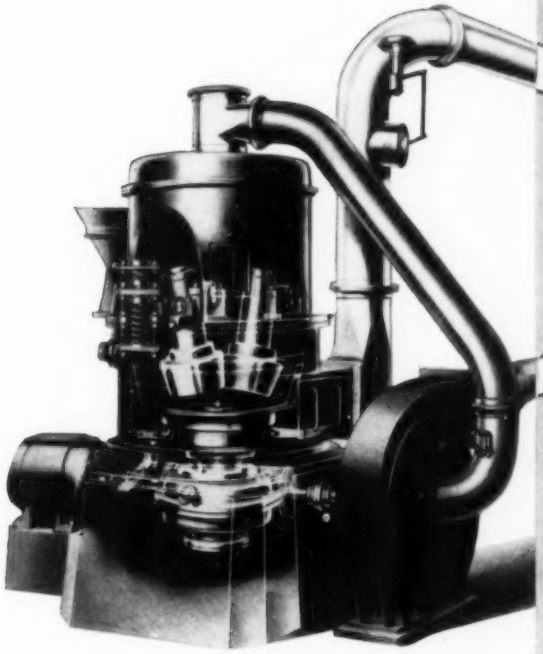
BERNARD G. SCHNEIDER has been appointed conveyor equipment sales manager, and FRANK G. STULLER chief engineer of the conveyor and process equipment division of Chain Belt Company, Milwaukee.

Mr. Schneider joined Chain Belt in 1926, and Mr. Stuller, who succeeds Mr. Schneider, in 1928.

Enter 174 on card, page 197

Maintain top-level

KILN PERFORMANCE *with* RAYMOND Bowl Mill Firing



PANEL BOARD CONTROL gives a continuous operating picture of Bowl Mill performance. A single unit or several Bowl Mills easily operated by one man.

NINETEEN-SIXTY is the 25th anniversary of the Raymond Bowl Mill—and this modern direct-firing unit still holds the lead in coal pulverizing economy and kiln burning efficiency.

Because of its time-proved advantages, more and more operators of lime, cement and dolomite kilns are equipping their new plants with Bowl Mills—or converting their old plants to modern Bowl Mill installations.

The resulting increased production and savings are due to these Bowl Mill features:

(a) Maintains proper coal-air mixture for uniform kiln performance.

(b) Handles coal of any grade or moisture content.

(c) Easily adjusted or lubricated while running.

(d) Dependably built for continuous 24-hour operation for long runs.

(e) High availability and wide range capacity.

For a better product and lower cost operation, choose the Raymond Bowl Mill on its 25-year record.

For further details, write for Raymond Bowl Mill catalog No. 75

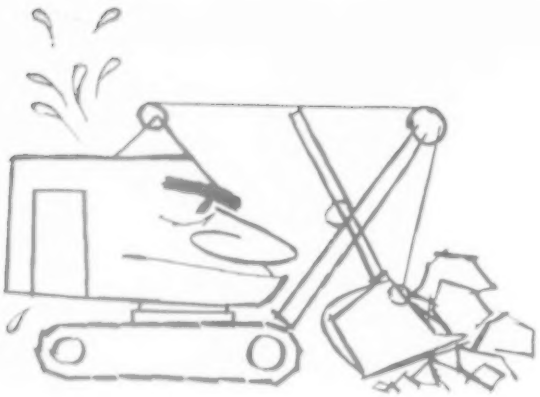
COMBUSTION ENGINEERING, INC.

Raymond Division

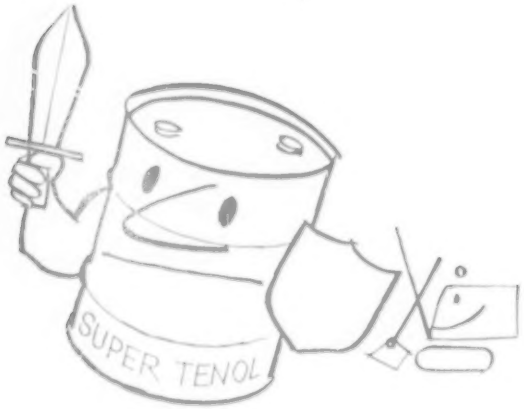
1122 W. Blackhawk Street
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada



Diesel engines powering heavy equipment in mines and quarries can dish it out day after day. But can they take it... year after year? The record shows they can...when lubricated and protected by Sinclair SUPER TENOL® Motor Oil.



Diesels safeguarded by SUPER TENOL can withstand high temperature and stop-and-run operation...protect vital engine parts from varnish, sludge, rust and acid corrosion. The reason: SUPER TENOL combines high quality base oils with special additives. Put SUPER TENOL to work for you...call your Sinclair Representative or write

Sinclair

SINCLAIR REFINING COMPANY

TECHNICAL SERVICE DIVISION • 600 FIFTH AVE., NEW YORK 20, N.Y.

HENRY W. HITZROT, who has been handling administration in international operations for Dorr-Oliver Incorporated, Stamford, Conn., has been transferred to the project department. Mr. Hitzrot will be concerned with the development and sales of complete phosphate rock, phosphoric acid and fertilizer processing units, engineered, designed, equipped and/or constructed by Dorr-Oliver. He will continue to make his headquarters at Stamford.

HOWARD M. HENKE has been named Southwest Region service supervisor of International Harvester Company's Construction Equipment Division. He will have headquarters in Dallas, Tex.

J. S. BOYD, formerly Southwest Region service supervisor, has been transferred in the same capacity to the Northwest Region.

ROBERT J. DYER JR. is replacing Mr. Henke as Territory No. 4 service representative of the Southwest Region. He will make his headquarters in Amarillo, Tex.

G. S. HESS, formerly service representative for the Northwest Region Terriories No. 1 and No. 2, now will work only in the Central Region.

G. J. LANDERS has been named to the newly created position of manager, marketing department of Blaw-Knox Company's Construction Equipment Division. He is responsible for the division's advertising, sales promotion, market research, and sales analysis.

J. WALTER SNAVELY became assistant district sales manager of Chain Belt's Milwaukee district sales office recently. He had been marketing manager of Chain Belt's conveyor equipment.

CHARLES T. YOUNG, active in the rubber industry for 62 years and long associated with Raybestos-Manhattan, Incorporated, died at the age of 90 after a prolonged illness. He had been factory manager of the plant at Passaic, president of the Manhattan Securities Company, and a director and vice-president of the parent company.

JOHN A. CRAVENS has been appointed district representative for Euclid Division of GM in the central sales region, which takes in Wyoming, Colorado, New Mexico, and Arizona. He succeeds OLIN A. LEE, who has been named manager of Euclid's Iron Range branch in Hibbing, Minn.

JACK D. GUNTHER, vice-president of Air Reduction Company, Incorporated, was recently elected to the board of directors of The Ruberoid Co. Mr. Gunther is a director of Cumberland Chemical Corporation, jointly owned by Air Reduction and Ruberoid, and an officer and director of Cuban Air Products Corporation, a subsidiary of Air Reduction.

RALPH LIPPERT has been advanced to the position of assistant manager of the Portable Plant Department of Smith Engineering Works, Milwaukee, Wis. In addition to his work with the design and development of portable plants, Mr. Lippert will also assist in the pricing of portable and semi-portable plants, and will work with the sales department.

STEPHEN M. REYNOLDS, attorney, of the law firm Spencer, Fane, Britt and Browne, Kansas City, Mo., has been appointed director of industrial relations for Minneapolis-Moline Company, Hopkins, Minn.

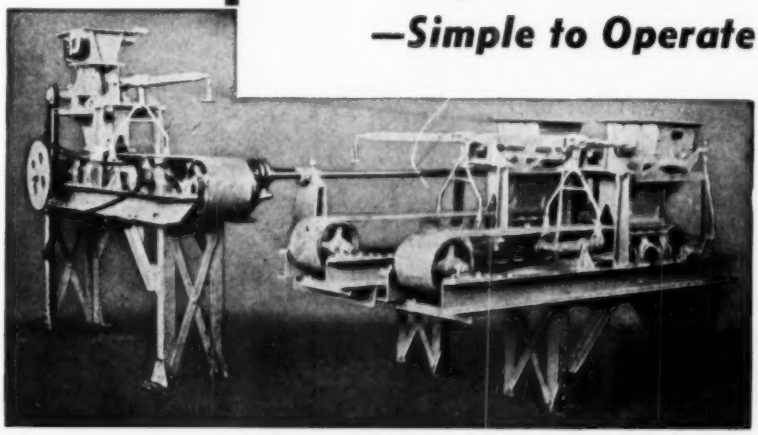
CHARLES E. STONEBRAKER has been named manager of customer service for B. F. Goodrich Industrial Products Company, a division of The B. F. Goodrich Company, Akron, Ohio. Mr. Stonebraker joined the company in 1948.

Battery of Poidometers in Process Industry

SCHAFFER POIDOMETERS

—Easy to Install

—Simple to Operate



Set the remote control devices and the Poidometer all but talks. It's versatile, reliable and will WEIGH—BLEND—FEED—MIX—RECORD and PROPORTION with the greatest accuracy. It's automatic in operation—it's a smooth operating machine and assures efficiency at high-speed.

NOW! Over 1600 serving bulk materials plants. Write for complete details and Catalog No. 5.

SCHAFFER POIDOMETER CO.

2828 Smallman St. Pittsburgh 22, Pa.

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EDWARD B. GREEF is the new district manager for the San Francisco office of the Traylor Engineering and Manufacturing Division, Fuller Company. He will be in charge of sales in California, Nevada, Arizona, and New Mexico.

The appointment of WALTER J. (WALT) BLAIR as vertical pump Product sales manager, Peerless Pump, Hydrodynamics Division, Food Machinery and Chemical Corporation, Los Angeles, Calif., has been announced. Mr. Blair joined Peerless in 1949.

A. F. (AL) GARLINGHOUSE, a founding partner of Gar-Bro Manufacturing Company, Los Angeles, Calif., recently received a Certificate of Merit as a leader in the service group for the construction industry. The award was presented by the U. S. Chamber of Commerce at a two-day National Construction Industry conference held in Washington, D. C.

Management of The Boston Woven Hose & Rubber Division of American Biltrite Rubber Company, Incorporated, Boston, Mass., announced plans to construct a new plant in Hohenwald, Tenn. The new plant will occupy approximately 200,000 sq. ft. and will cost approximately $3 million.

CHARLES R. ISSACS has been promoted to the position of vice-president in charge of sales for the D-A Lubricant Company, Incorporated, Indianapolis, Ind. Prior to his election to the vice-presidency, Mr. Isaacs was sales manager of the corporation.

RICHARD M. SIBLEY has joined the International Sales office of Dorr-Oliver Incorporated at Stamford, Conn. He has been with the firm for four years, most recently serving as a sales engineer in the Pittsburgh, Pa., office. In his new position, Mr. Sibley will be responsible for sales of Dorr-Oliver products and services in Venezuela and the Caribbean area.

Manufacturing operations in Brazil were begun formally on April 6 by Huber-Warco Company of Marion, Ohio, manufacturers of motor graders, road rollers, and maintainers.

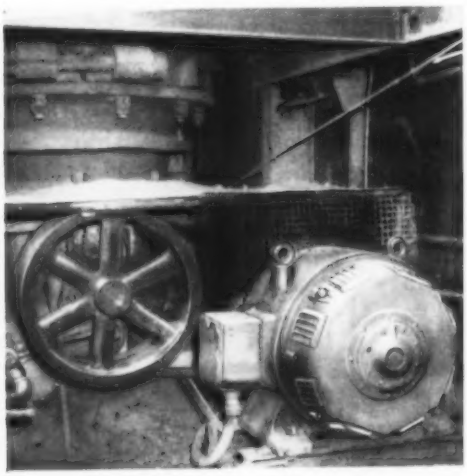
The Brazilian plant is organized as Huber-Warco do Brasil, S. A., a wholly owned subsidiary of Huber-Warco Company.

JOHN HAGEMAN has been assigned to the Toronto, Canada, area for Richardson Scale Company, Clifton, N. J. Mr. Hageman will complement the activities of Richardson's Montreal office, and also lend support to Sullivan Mill Equipment, Ltd., Toronto, Richardson's Ontario agents.

WILLIAM F. HUMPHREY was appointed director of sales, Marine and Industrial Engine Division, Chrysler Corporation. Mr. Humphrey was formerly director of sales, Hercules Motor Corporation.

He succeeds L. E. NELSON, who has been vice-president—sales for the division. Mr. Nelson is re-joining the Automotive Sales Group, Chrysler Corporation.

Lots of Pits and Quarries Use BROOK MOTORS



Built for tough, grueling jobs *Brook Motors are insurance against shut-downs.* Despite their stamina, dependability and longevity they actually *cost less* than ordinary motors. Aggregate producers everywhere are cutting costs with Brook Motors. The motor shown is one of many Brook Motors at the sand and gravel plant of V. R. Dennis Construction Co., San Diego, Cal. Available in all standard enclosures—1 to 600 HP. *Send for brochure and name of your dealer.*

SINCE 1904 BROOK ELECTRIC MOTORS

"World's Most Respected Motor"

BROOK MOTOR CORPORATION

3302-04 W. PETERSON AVE., CHICAGO 45, ILL.

IN CANADA: BROOK ELECTRIC MOTORS OF CANADA, LTD. 250 UNIVERSITY AVE., TORONTO, ONTARIO

Warehouses, Factory Representatives, Distributors in Principal Cities.

Enter 178 on card, page 197

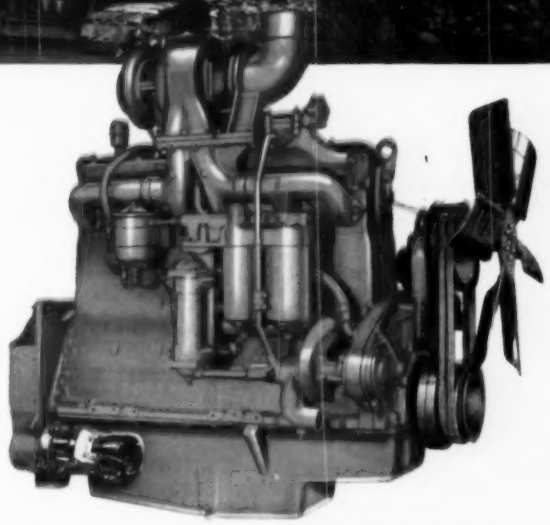
Check NEW MACHINERY, pages 62—70, and MORE INFORMATION, PLEASE, pages 197—198, for solutions to problems at your operation.

Here's TEAMWORK FOR PROGRESS

This 3½-yd. Koehring 1205 has torque-converter drive — also available with mechanical drive.

NOW...

Koehring 1205 is powered by 21000 Diesel



Several factors influenced Koehring engineers to select the Allis-Chalmers 21000 diesel for their Model 1205 crane-excavator.

Outstanding performance, of course, was the prime convincer. The 21000 provides plenty of power — and still works at far below its design capacity. Torque is consistently high throughout the entire working range — for both lugging ability and top performance at high speeds. Users report quick starting, without ether, in sub-freezing weather.

Modern design of the 21000, with its entirely new controlled-turbulence, open-combustion system, appealed to Koehring.

Big fuel savings — The turbocharged 21000 uses 8 to 27 percent less fuel than other diesels in its class. That means savings of up to 1 gallon in every 4!

Dependability to match — Since fuel is *burned* — it isn't left to "gook" up rings, valves, crankcase. Raw fuel doesn't wash away or dilute lube oil. Fuel makes horsepower, not waste heat. Further, there's tough, heavy-duty design, with "stay-on-the-job" durability in every part.

Pluses like these have led Koehring and other manufacturers to standardize on the 21000 and the companion naturally aspirated 16000 diesels. Get full information from your dealer or contact Allis-Chalmers, Engine — Material Handling Division, Milwaukee 1, Wisconsin.

Go first class . . . use

ALLIS-CHALMERS

power in all your equipment

TEAMWORK FOR PROGRESS

BC-30

NEW

GILSON *Porta-Screen*™ PORTABLE TESTING SCREEN

Motor or hand-driven . . . operates free-standing, bolted to semi-permanent location, or on bare ground . . . dismounts in 2 portable sections . . . handles samples up to 25 lbs., 1½-in. to 200-mesh.

USE *Porta-Screen* FOR:

- ★ field inspection and testing
- ★ ready-mix plants
- ★ blacktop plants
- ★ concrete products plants
- ★ small aggregates plants
- ★ lightweight aggregates
- ★ ores and minerals
- ★ mass separation for research
- ★ screening under direct wash water

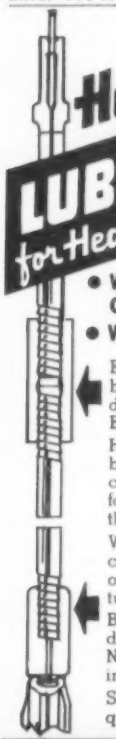
Write for literature

The new Gilson Porta-Screen
The standard Gilson Testing Screen
Gilson Sample Splitter and other accessories

GILSON SCREEN CO.
MALINTA, OHIO

Enter 180-A on card, page 197

Heavy Duty LUBRICATION for Heavy Duty Drilling



- **WARREN'S DRILL BIT AND COUPLING LUBRICANT**
- **WARCO ROCK DRILL OILS**

Eliminate freezing of assemblies used in sectional rod drilling with Warren's Drill Bit and Coupling Lubricant.

High film strength, high lubricity, non-melting lubricant developed especially for drill bit and coupling threads.

Warco Rock Drill Oils exceed the rigid specifications of leading drill manufacturers.

Both products have produced superior results on the Niagara Power Project during the past year and a half.

Samples and details on request.

THE WARREN REFINING & CHEMICAL CO.
CLEVELAND 2, OHIO

Enter 180-B on card, page 197

JACK A. CHANTREY has been elected treasurer of Bucyrus-Erie Company, South Milwaukee, Wis. He succeeds V. C. STUDLEY, who continues to be vice-president in charge of finance. Mr. Chantrey joined Bucyrus-Erie in 1959 as assistant treasurer. Previously he had been with Ford Motor Company, Standard-Vacuum Oil Company, and the First National City Bank of New York.

JAMES T. EDDINS has been named sales representative for the Austin Powder Company, Cleveland, Ohio, in the Georgia-eastern Tennessee, North and South Carolina territory. Mr. Eddins, who has served Austin in the Chicago district since 1953, will make his headquarters in Knoxville.

Electric Reduction Company of Canada, Ltd., Toronto, Ont., has awarded an engineering and construction contract to Leonard Construction Company, Chicago, Ill., covering ERCO's Port Maitland, Ontario project for the manufacture of phosphoric acid and industrial phosphates, and the extension of existing superphosphate manufacturing facilities.

RICHARD D. ROSENBERG has been named vice-president in charge of international relations for The Dayton Rubber Company, Dayton, Ohio. This position was created because of expanded operations. Mr. Rosenberg has been with the company since 1951.

Meissner Engineers, Incorporated, of Chicago, have opened a branch office at Juneau, Alaska, to handle present and potential consulting engineering work, both civil and industrial, in that new state.

ELWOOD GRAHAM is in charge of this office. Before joining Meissner, he had been with the State Highway Department of Arizona for more than eight years.

Pacific Mercury's Marketing Division, currently located at 13232 Leadwell, North Hollywood, is moving to the company's home office plant at 8345 Hayvenhurst Avenue, Sepulveda, Calif. The move offers the Marketing Division the additional space it requires.

GERALD A. TAMBLYN, formerly manager of industrial tractor shovel sales development, has been promoted to the position of assistant general sales manager, industrial trucks, Yale Materials Handling Division, The Yale & Towne Manufacturing Company. Mr. Tamblyn joined the Yale sales organization in 1957.

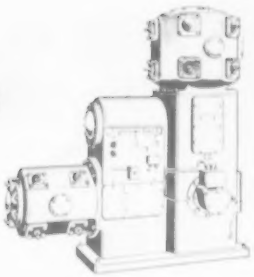
St. Regis Paper Company has announced the appointment of C. C. SMITH as district sales manager for the Cleveland area of its Bag Division. He had been Bag Division sales representative in the Cleveland area. FRED LEFAIVRE is sales representative in the Cleveland area, and reports to Mr. Smith.

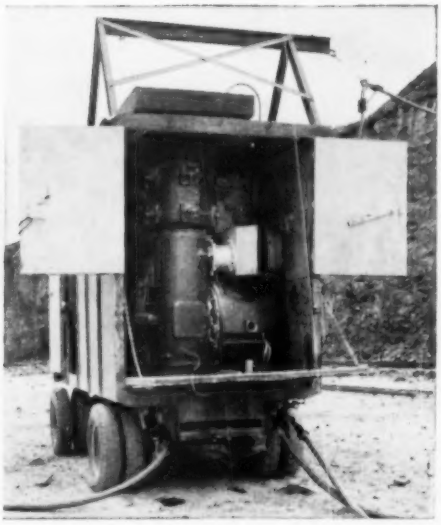
ROBERT F. STEWART has been appointed vice-president and assistant general manager of Western Precipitation Division of Joy Manufacturing Company, Los Angeles, Calif.

DOUGLAS J. KRAMM has been appointed lime and chemical kiln sales engineer by the Traylor Engineering and Manufacturing Company Division of the Fuller Company. Mr. Kramm, who has been with the company since 1952, will be at Traylor's main offices in Allentown, Pa.

New, enlarged quarters are now being occupied by Fuller Company's Kansas City district office at 7501 Mission Rd., Kansas City 15, Mo. DAVID W. ARMSTRONG continues as district manager, a position he has held since the office was opened in 1955.

Stationary Compressors go PORTABLE





Ingersoll-Rand XLE compressors provide mobile air power plants for Carbon Limestone quarry

Ingersoll-Rand's XLE compressor was not designed with portability in mind. But its compactness and exceptional running balance made it the ideal solution to a "portable" air power problem.

The Carbon Limestone Company of Lowellville, Ohio, needed two large-capacity, heavy-duty compressed air plants which could be moved easily to keep up with drilling operations in the two-mile-long quarry. Two 150-hp XLE electric-driven compressors, each mounted on a cargo trailer with an air-cooled water cooler, met every requirement to excellent advantage.

Each of the 950-cfm compressors may move itself from one drilling site to the next, by means of an I-R utility air hoist and an anchored cable.

These two XLE units were put into operation in 1953, and have been in constant use ever since with no maintenance problems. One set of channels for one Channel Valve on one compressor has been the only part replaced!

This is an unusual type of installation, but it well illustrates the *extra-value* features which suit the XLE to any air power application. The sealed frame keeps the abrasive quarry dust out of the running gear, and the full-floating aluminum bearings and metallic packing never need adjustment. Ingersoll-Rand's amazing air-cushioned Channel Valves cut valve maintenance to an absolute minimum. This enclosed-trailer installation wouldn't have been possible without the unmatched compactness, excellent balance and low attention requirements of the XLE.

Of course, Ingersoll-Rand builds "regular" portable compressors, too—the Gyro-Flo rotary portables are the leaders in their field. And I-R reciprocating compressors, from ½ to 7500 hp, may be found in every possible application, every type of industry. For help with your compressor needs, call your I-R man today.

Ingersoll-Rand

122A1 11 Broadway, New York 4, N.Y.

The World's Most Comprehensive Compressor Experience

A case history of Bemis service that could mean a lot to you

Our principal business, of course, is to sell bags in any honorable way.

But we much prefer to sell them through service, such as we have had the opportunity to render over the years to General Material Company, St. Louis.

The General Material–Bemis case history, related chronologically here, shows some of the many ways in which Bemis is able and anxious to work with customers:

1952 General Material Company, a ready-mix business packaging its product under the trade name "Pree-Mix," is launched. A Bemis specialist advises the young company on bag construction and design, and assists in setting up a packing line.

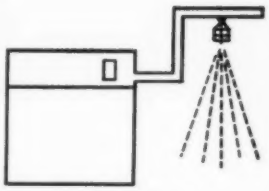
1956 General Material outgrows initial plant, constructs new plant with much greater capacity. To handle the increased output, Bemis Packaging Service representatives work with company officials and install complete Bemis packing line: Bemis Gravity Packer, Vee-Trof Conveyor and Bemis Sewing Machine Pedestal. Mr. Martin W. Melican, plant superintendent, states that "the use of the Bemis Gravity Packer has been instrumental in doubling the output of our products."

1960 Now an established company, General Material still receives close personal attention from Bemis multiwall specialist who keeps Mr. Melican and others informed of such new developments as Bemis Extensible Multiwalls. This close personal attention is typical of Bemis service.

This case history deals with one specialized phase of the rock products industry—but it indicates the wide range of facilities, technical skills, and packaging experience that Bemis makes available to all customers. If you would like to discuss your own packaging operation with a Bemis man, write today.

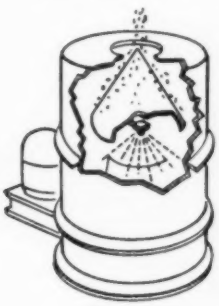
Where flexible packaging ideas are born

GENERAL OFFICES 408-Y PINE STREET, ST. LOUIS 2 • SALES OFFICES IN PRINCIPAL CITIES

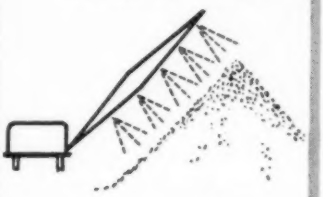


J-M Chem-Jet—
Engineered systems that control dust at its source

J-M Hydro Voluet Scrubbers—guaranteed 99% efficient in removing dust, fumes, odors

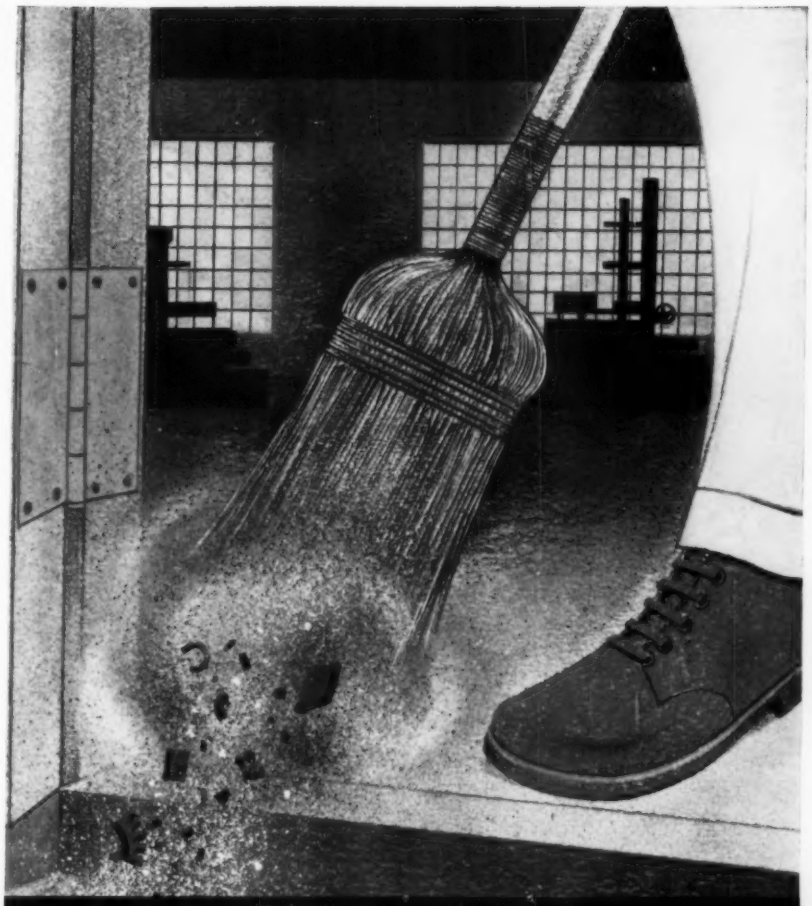


J-M Verticone—
for dust-free unloading and materials handling



J-M Compound S-P—
prevents costly windage loss of materials stockpiled outdoors

new low prices on J-M equipment



You can't sweep away serious dust problems

Any dust problem makes efficient housekeeping impossible; increases your overhead; makes for premature obsolescence of equipment; reduces morale of personnel . . .

For years Johnson-March has specialized in engineered answers to dust problems. By developing new techniques J-M makes possible low cost dust control for all plants.

Take the first step by arranging for an on-the-spot analysis by a Johnson-March engineer. Ask your consulting engineer or write to Johnson-March Corporation, 3018 Market Street, Philadelphia 4, Pa.

JOHNSON MARCH | **dust control engineers**

Steel wheels specified. Dual pneumatic tires standard.

LIMA AUSTIN-WESTERN

Crushes old concrete to aggregate subbase

"We crush old concrete into 2½-in. aggregate for a subbase on asphalt and stone parking areas. Our portable Lima Austin-Western 2036 primary jaw crusher turns out a high daily tonnage with an absolute minimum of maintenance. We also have a Lima A-W apron feeder on another plant. The feeder has doubled production.

"Based on our experience with the crusher, feeder, and an Austin-Western grader, I'd say that the Baldwin-Lima-Hamilton Corporation turns out quality products which hold up longer and do better jobs than most competitive equipment."—*George H. Souter, Gargaro & Souter, Inc., Detroit.*

Lima Austin-Western offers a complete line of top quality crushing, screening and washing equipment. The finest materials, skilled workmanship, simplicity of design, and engineering experience are reflected in performance records. Depend on Lima Austin-Westerns for accurately sized gravel in quantity and years of trouble-free service. Choice of compact, self-contained portable units or custom-engineered stationary installations. Both types assure you high-speed operation and lower tonnage costs. Ask a Lima A-W owner. See your nearest Lima Austin-Western distributor for facts and figures. Or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

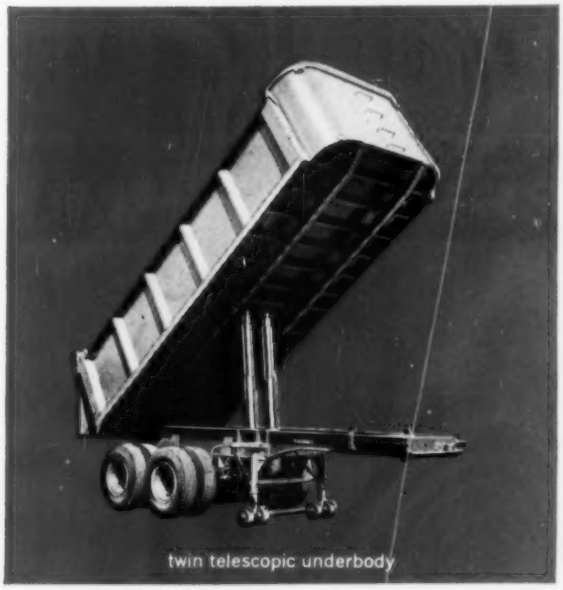
BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

6038

four ways to move more... and make more
TRAILMOBILE DUMP TRAILERS

front mount telescopic (single or twin)



twin telescopic underbody

twin piston underbody

frameless telescopic

Here's a wide range of dump trailers that are designed to help you handle the big earth moving jobs profitably. There's extra profit in Trailmobile dump trailers because you can match them to your normal operating conditions. For example, you can choose from four types of hoists . . . you can choose from several body styles and you have a choice in chassis construction. Also, you are offered a wide variety of optional custom features.

The booklet offered at the right gives complete information on these big capacity profit makers. Send for your copy now.

TR-688

TRAILMOBILE INC.

CINCINNATI 9, OHIO

Please send me a booklet describing your complete line of Dump Trailers.

Name_____

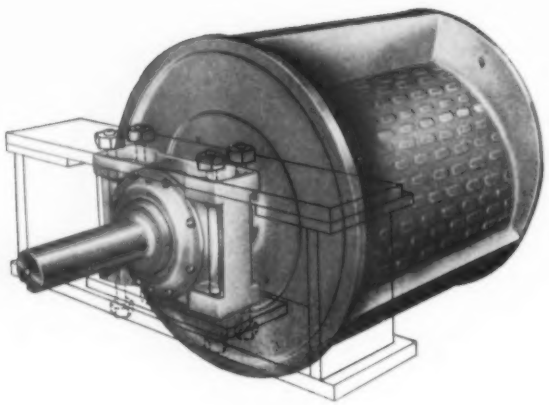
Company_____

Street_____

City_____ State_____

HIGH REDUCTION RATIOS with HIGH CAPACITY

KENNEDY DUAL-ROTOR IMPACT BREAKERS



This is the exclusive KENNEDY solid rotor of armor plate steel machined to perfect balance. Its entire face is hard surfaced. Manganese steel end discs prevent side wear and confine process material to the reduction area. A heat treated, alloy steel shaft is pressed and locked into the rotor core. Heavy duty, self-aligning, spherical roller bearings are rigidly attached to the heavy, box section base frame.

KENNEDY Impact Breakers are characterized by high capacities, high reduction ratios and a high proportion of cubical product at relatively modest initial and operating costs. Five convenient sizes are now available, from 30 x 48 to 60 x 72. These, plus the 36 x 30 single-rotor model, make up a line of machines with a size for every application.

KENNEDY Impact Breakers feature:

- primary and secondary reduction in one operation . . . because of their higher capacity, fewer machines are required.
- use of the principle of true, controlled, free impact . . . rock is shattered along the lines of natural cleavage.
- simple, inexpensive maintenance . . . truly effective use of wearing parts keeps output and product quality high.

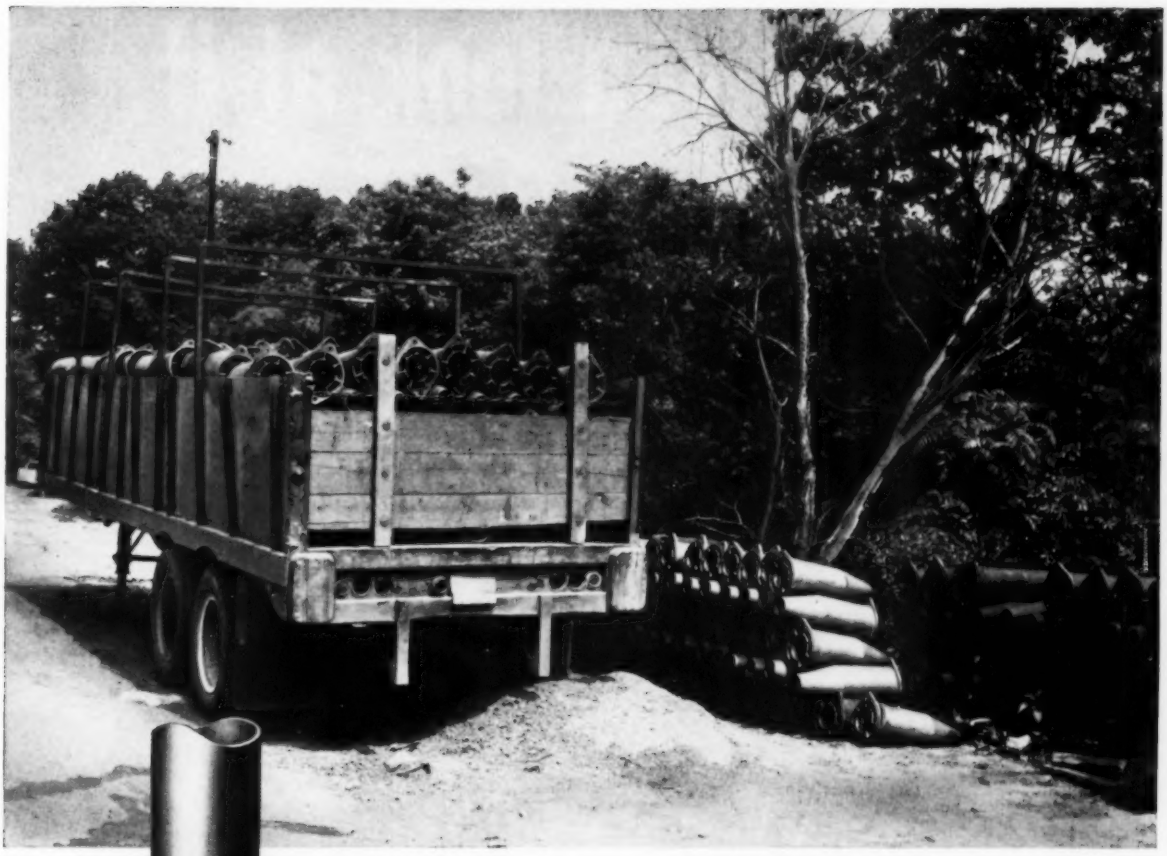
Send for KENNEDY Bulletin 60-A describing the many features of KENNEDY's Dual-Rotor Impact Breakers, the most efficient and effective impact breakers built.

KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Rod & Ball Mills • Kilns & Kiln Accessories • Dryers • Scrubbers • Screens • Pneumatic & Mechanical Conveyors • Complete Crushing, Lime, Cement & Carbon Paste Plants. • Research & Testing Service.



TYPE
C10
CYCLO-TRELL

Ammunition for the war on dust!

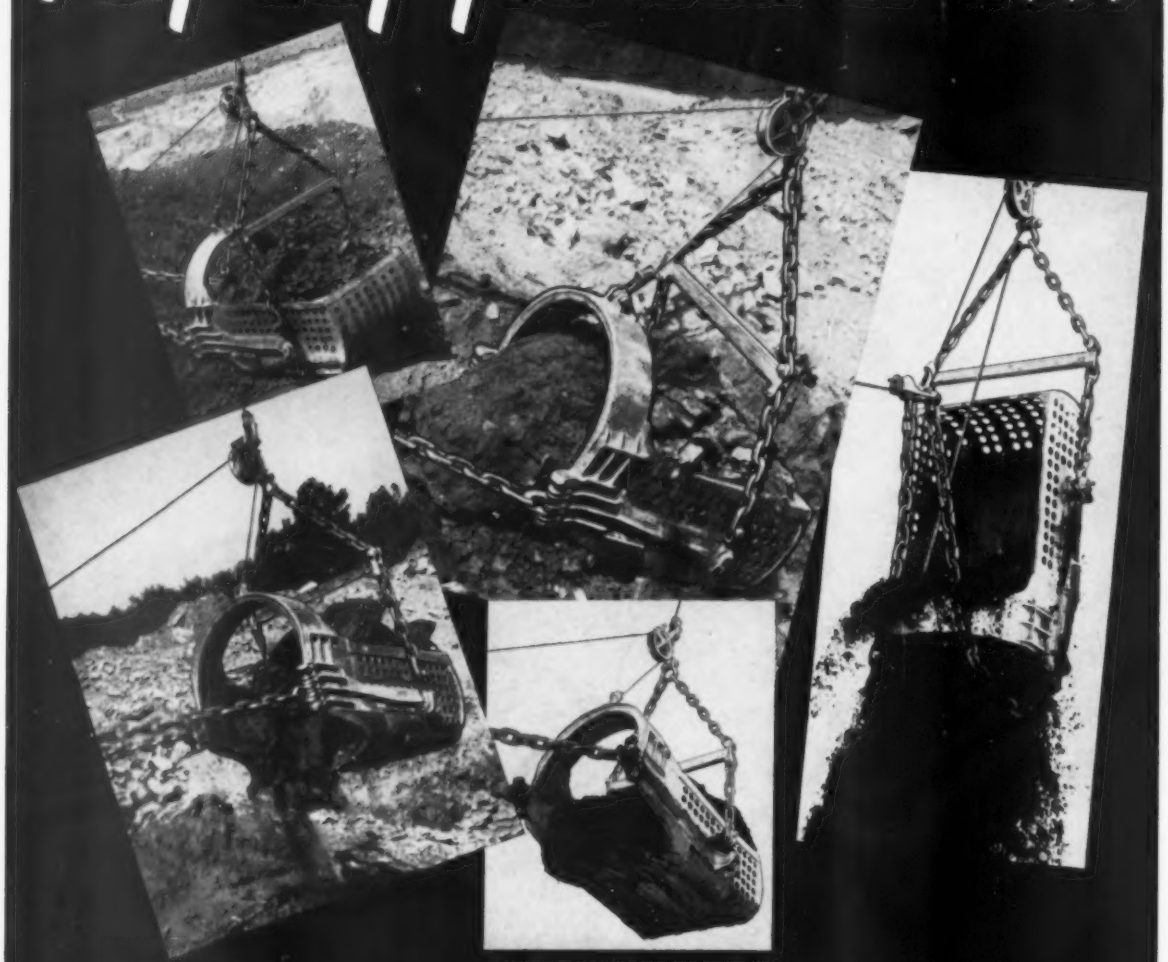
Fighting dust is the purpose of this load of Cyclo-trell C10 "shells." ■ Cyclo-trell units for process gas or air cleaning in steel mills, refineries, paper, cement or chemical plants give you high efficiencies. ■ Engineered to fit each specific job, Cyclo-trell units are available in a wide range of sizes and types including C10, C24, IC (Involute Cyclo-trell) and ICL (Involute Cyclo-trell, Lined). ■ Why not let us consult with you on your specific dust collection problems? For further information, write for Bulletin 300 which describes several applications in detail.

Research-Cottrell

RESEARCH-COTTRELL, INC., Main Office and Plant: Bound Brook, N. J.
Representatives in principal cities of U.S. and Canada

RESEARCH COTTRELL INC
TRADE MARK
RC-209

Any way you look at it...



HENDRIX DRAGLINE BUCKETS

✓ Fill Faster

✓ Handle Easier

✓ Dump Cleaner

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards—Perforated or Solid

Hendrix Lightweight DRAGLINE BUCKETS

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

Gardner-Denver RP600 rotary portable compressors at work on sewer job.

Work 'em anywhere—in any weather Gardner-Denver rotary portables can take it

You can depend on Gardner-Denver rotary portable compressors to deliver the air you need in any weather—any climate, any altitude. They are ruggedly built, run smoothly, cost little to maintain. Six capacities from 85 to 900 cfm. Write for Bulletin RC-1. See your Gardner-Denver distributor soon.

All-weather operation—assured by efficient cooling system.

No dry starts in cold weather—clutch on RP125 and larger sizes assures full lubrication when compressor is engaged.

Thrifty—"THRIFTMETER"® fuel control regulates engine to meet air demands.

Easy to maintain—rotors and blades can be inspected and changed in minutes.

Gardner-Denver RP900 rotaries provide power for 5½" drills on Niagara power project.

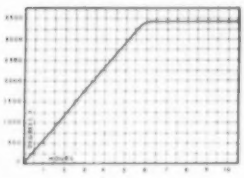
EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

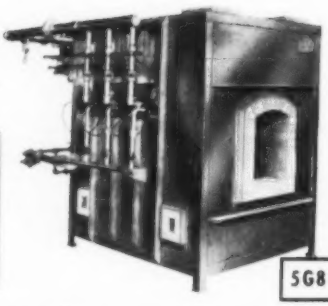
GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Typical **5G8 Kiln** time-temperature curve





5G8 Testing Kiln

high temperature
testing kiln

Cuts operational and maintenance costs!

NOW—High capacity, high operating temperatures and versatility . . . combined especially for experimental work in the ceramic field. *Compare* the DFC High Temperature Test Kiln, then judge for yourself.

Capacity: 15 cubic feet. Carefully planned chamber dimensions afford maximum utilization of firing space. For smaller loads a false hearth may be installed to reduce firing space and costs.

Wide Range: 500° F. to 3400° F.! Simple burner arrangement permits controlled low temperature drying, soaking or holding. Temperature can be increased at the rate of 150° to 500° F. per hour (up to 3000° in six hours). Lower ranges are attained simply with a gas-air mixture through one or more burners. Higher temperatures, above 3100° F., are made possible by the use of proportioning control of injected oxygen. Needs only a 16-oz. motor blower.

Lower cost — Longer life — More for your equipment dollar! Air-cooled gas-air mixers, refractory tunnel nozzles, motor blower and oxygen metering equipment are the basic elements of the combustion system. NO RECUPERATORS OR REGENERATORS, making the kiln simple in design, less expensive to buy, less expensive to maintain.

Safe to operate — Convenient! Front loading; no need for heavy auxiliary lift equipment. No loading platform; load through the door at floor level.

Flexibility of temperature control! Choose your own control system to fit your program. Precision temperature control through the entire range can be provided.

SPECIFICATIONS:

Interior dimensions: 27" wide x 36" long x 42½" high
Door dimensions: 18" wide x 22½" high
Over-all dimensions: 7' x 10'

DFO-10A

For full information write:

Denver Fire Clay Company

3033 Blake Street, Denver 17, Colorado

Enter 190-A on card, page 197

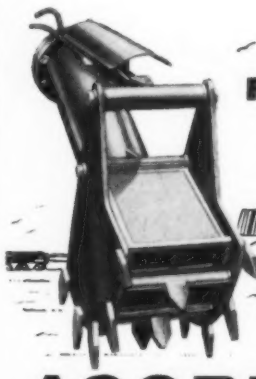
DREDGE SLEEVE CLAMPS

Sturdy • Practical • Dependable • Economical

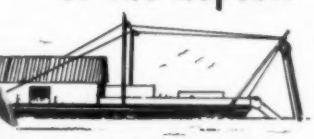
Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.
9th Ave. at 4th, Mendota, Illinois

Enter 190-B on card, page 197



Pump the FULL DEPTH of the deposit



with a **VAN GORP** DREDGING

AGGRETATOR

(SIZES AVAILABLE FOR 6-8-10-12 INCH SUCTION LINES)

- *Cuts through clay seams*
- *Loosens cemented deposits*
- *Dislodges large rocks*

No one knows how many tons of material are lost each year in dredging operations because of bad pumping conditions. However, we know that the use of a Van Gorp ***Aggretator*** has increased pumping time from 5 to 25%, depending on the deposit. We know too, that this increase in production usually pays for the cost of an ***Aggretator*** within a few months. It's easily installed, has a long productive life, and existing power is sufficient to drive the hydraulic pump. ***Write*** for details and illustrated brochure on 4 ways to increase your dredging production.

VAN gorp MFG., INC.

DEPT. PQ, PELLA, IOWA

Enter 190-C on card, page 197

Interim Progress Report on CF&I-Wickwire's new wire rope

DOUBLE GRAY-X®

Falcon Seaboard Drilling Company orders carload

The first company to use a prototype of Double Gray-X was the Falcon Seaboard Drilling Company of Tulsa. Aware that modern drilling practices demand the best possible equipment, Falcon Seaboard tested Double Gray-X on some of their rotary drilling rigs, an operation that subjects ropes to extreme abuse. Mr. Jack Starr, Vice President in Charge of Drilling, commented, "The results obtained from original tests with Double Gray-X prototype led to our decision to order *a carload of this improved product*. Falcon Seaboard insists on the best products, in order to serve the oil industry in accordance with today's modern standards."

The Secret of Longer Rope Life

CF&I-Wickwire engineers, after intensive research, discovered that by using an entirely new wire drawing technique—including the use of Molysulfide* in the lubricant—the characteristics of the wire rope were greatly improved. This method creates a permanent molecular jacket around the individual wires that provides these benefits:

- **reduced friction between the individual wires in each strand of Double Gray-X during service**
- **minimized surface imperfections in the wires of Double Gray-X**
- **wires have greater resistance to abrasion, crushing and bending**

If you are a user of wire rope, you can *increase* the safety of your operation and *reduce* equipment downtime with Double Gray-X. Made in a wide variety of sizes and constructions, Double Gray-X is recommended for all types of equipment. For complete details on this new wire rope, call the nearest CF&I sales office or see your local distributor.

Greater Strength

The molecular shield around this new premium wire rope gives Double Gray-X longer life. In addition, you get the *extra strength* for which Double Gray has always been famous. Made of extra improved plow steel with an Independent Wire Rope Core of the same material, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.

*Registered Trademark of Climax Molybdenum Co.

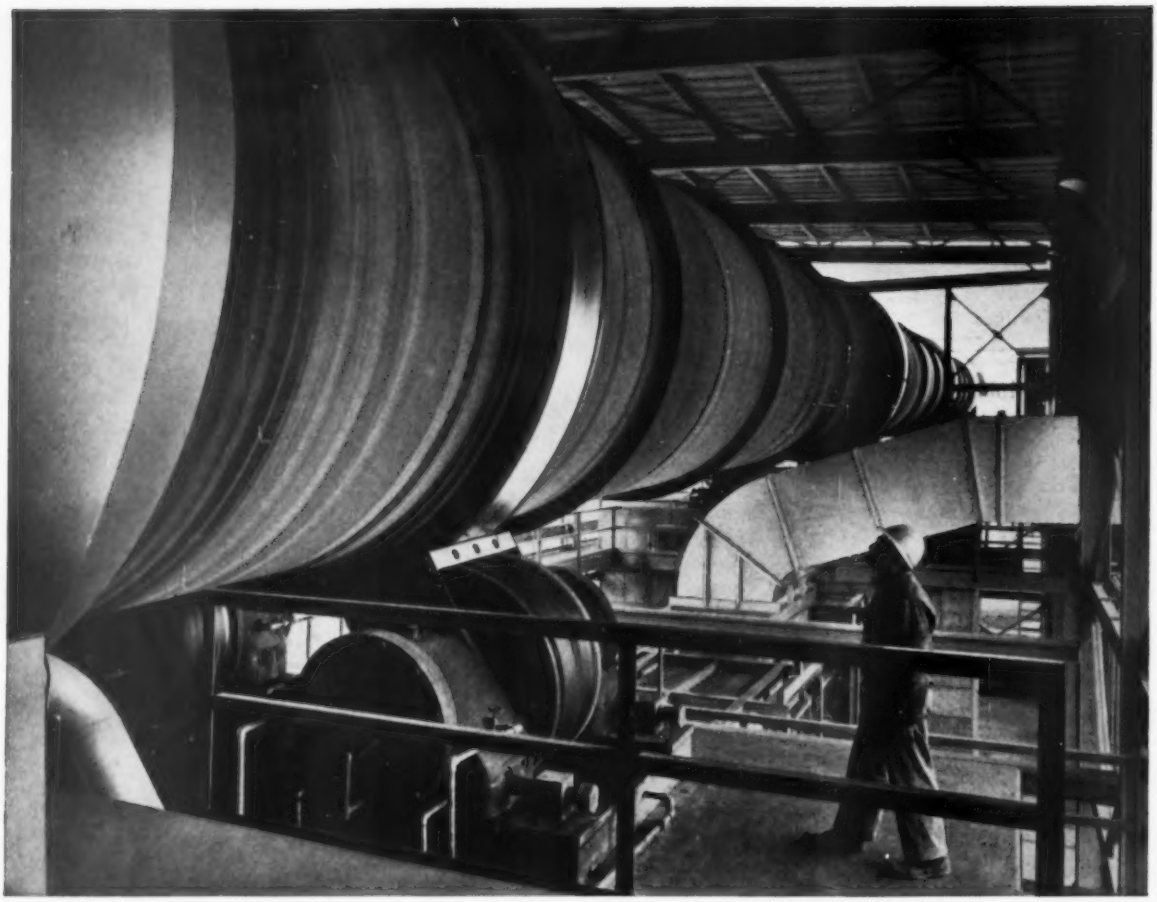
7633-A

CF&I STEEL **WICKWIRE ROPE**

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION** — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

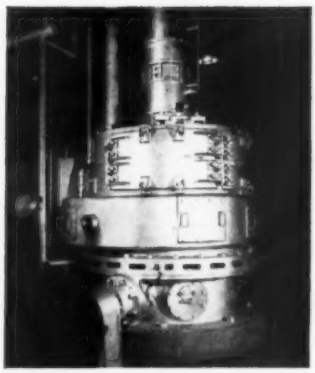


B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

A B&W EL Type Pulverizer enables the Cape Girardeau Plant of the Marquette Cement Manufacturing Company to direct-fire continually one of the largest kilns in the industry. They operate their pulverizer on a 24-hour day, 7-day-week basis and meet all production requirements. And — after well over two years of rugged grinding service this sturdy pulverizer has never caused an unscheduled plant shut-down.

Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.



B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

NOW! A SCREEN WITH A

rubber bumper

HENDRICK RUBBER CLAD PERFORATED METAL is now available with a specially designed rubber covering. Ideal where extreme abrasion is a problem, rubber clad Hendrick Perforated Screens assure far less plate wear. Large chunks of ore, coal or stone hit the screen with a fully cushioned shock... the rubber coating also takes the brunt of wear by protecting the steel plate underneath. The rubber laminate is bonded to steel by a new adhesive and vulcanized under controlled heat.

For more details contact your local Hendrick representative or mail in the coupon direct.

HENDRICK Manufacturing Company
Carbondale, Pennsylvania

PERFORATED METAL SCREENS • WEDGE WIRE SCREENS • CASCADE WEDGE WIRE SCREENS
WEDGE SLOT SCREENS • RUBBER CLAD PERFORATED SCREENS • FLANGED LIP SCREENS
FLIGHTS • SHAKER AND CONVEYOR TROUGHS.

HENDRICK Manufacturing Company
39 Dundaff Street, Carbondale, Penna.

Gentlemen: I would like to learn more about Hendrick Rubber Clad Perforated Metal Screens.

☐ Please have representative call.
☐ Please send FREE literature.

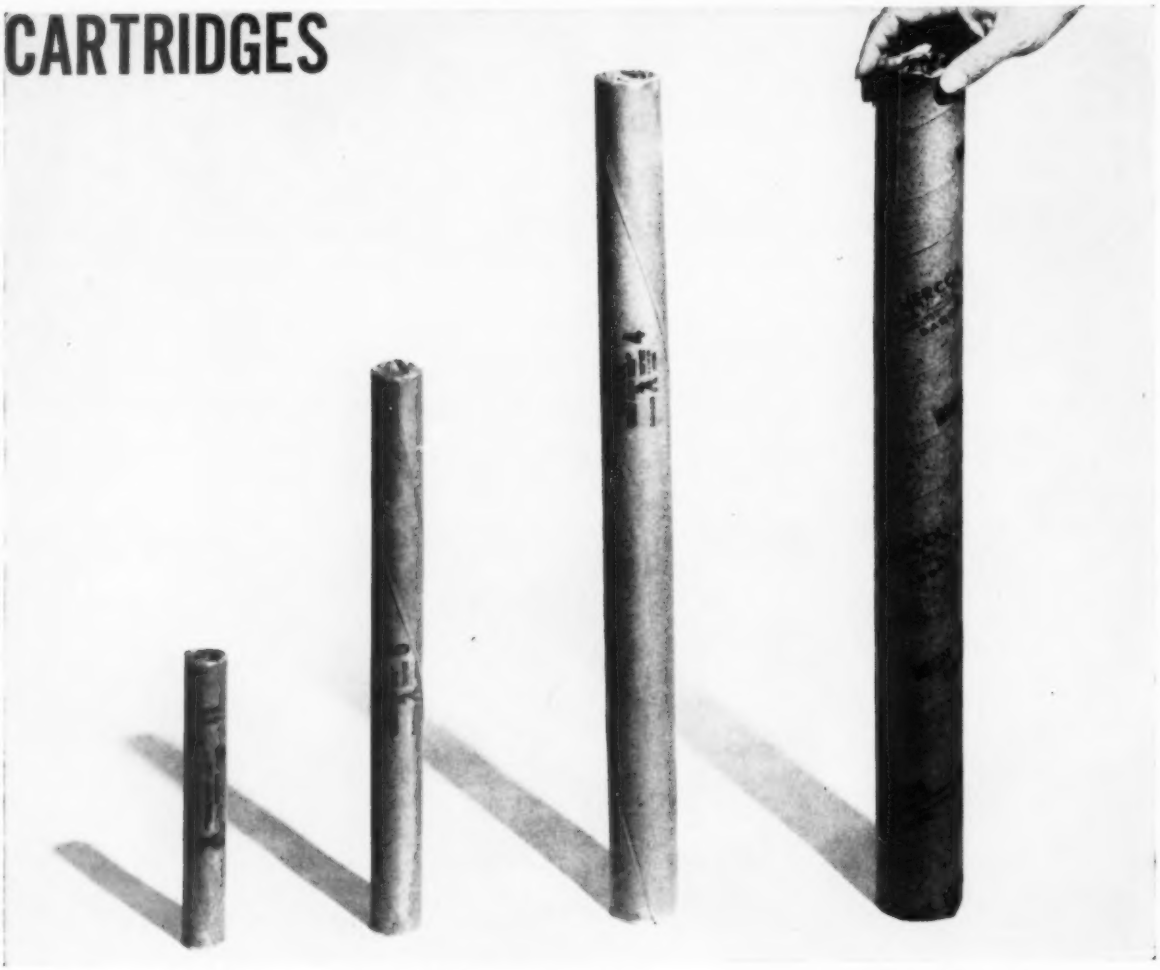
NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

HERCOL®—A LOW-COST EXPLOSIVE—NOW AVAILABLE IN SMALL-DIAMETER CARTRIDGES



The Hercol series of low-cost, cap-sensitive, high-ammonia-content explosives are now available in cartridges of small diameters and standard lengths, as well as in the larger diameters and special packings.

The ability of Hercol to produce excellent fragmentation, its water resistance, Class 1 fumes, and high cartridge count—plus its low cost—have already been proved to the economy-minded quarry and open-pit operator.

Now that Hercol is manufactured in the smaller diameters, with Class 1 fumes, these same economies are available to the underground operator.

Contact the Hercules sales office nearest you or ask your Hercules representative for more detailed information on how Hercol can reduce blasting costs for you, too.

Properties of Hercol

	Hercol	Hercol 2	Hercol 4	Hercol 6
Fumes	Good	Good	Good	Good
Cartridge count—1¼ by 8-in. cartridges per 50 lb.	130	120	140	165
Cartridge diameter, in.	4 to 8½	1 to 3½	1 to 3½	1 to 3½
Weight strength, %	70	68	68	68
Cartridge strength, %	48	50	34	19
Water resistance	Fair	Good	Fair	Fair

A special grade of Hercol is formulated for seismic "pattern shooting" when the drill-holes are relatively dry.

Explosives Department

HERCULES POWDER COMPANY

INCORPORATED

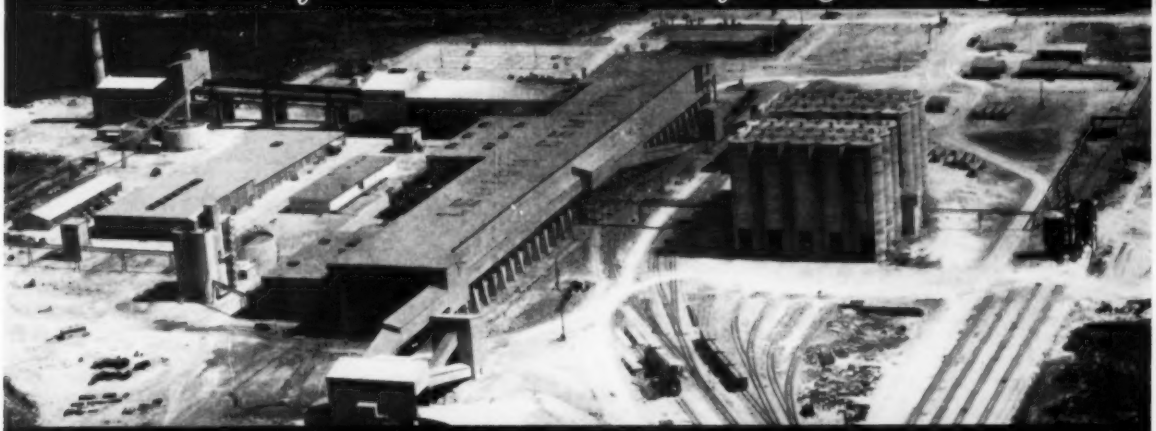
900 Market Street, Wilmington, Delaware

KR60-1

BIRMINGHAM • CHICAGO • DULUTH • HAZLETON • JOPLIN • LOS ANGELES • NEW YORK • PITTSBURGH • SALT LAKE CITY • SAN FRANCISCO

Lehigh
Portland Cement Company
relies exclusively on Buell Precipitators and Norblo arresters for dust control and the elimination of air pollution at its new Miami, Florida plant. In clincker handling and finish grinding, packhouse and crushing plant, Buell-Norblo bag-type dust arresters assure pleasant, safe, dust-free working conditions. And Buell Electric Precipitators make certain that the kiln exhaust gases are absolutely clean. There's no visible discharge from the stack under normal weather conditions, even though its height is limited by the C.A.A. Getting rid of air-borne waste is particularly important to Lehigh because the new plant is on one of the approaches to Miami's famed International Airport. • The recent acquisition of Norblo now allows Buell to offer a complete combination of systems for industrial dust collection and recovery. With Buell, you get the integrated know-how and experience for which there's no substitute. The Buell Engineering Company, Inc., 123 William Street, New York 38, New York. Northern Blower Division, 6404 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Limited, London, England).
Buell Dust Collection Systems: Cyclones/ Electric Precipitators / Bag Collectors / Combination Systems / Classifiers

Buell-Norblo system solves unusually tough dust problem



buell Norblo

PROOF THAT CHEVY'S BIG NEW CABS ARE BUILT FOR A BETTER DAY'S WORK!

"THESE TRAILS WOULD SHAKE THE CAB OFF AN ORDINARY TRUCK...BUT NOT OUR CHEVY"

Few trucks are subjected to the body-wracking beatings that are part of a day's work for this Chevrolet Series 60 pulpwood hauler, owned by J. E. Fox, North Carolina logging contractor. As Bobby Fox, a partner in the business points out, "Loaded full-up with pulpwood, we drive right over stumps and potholes you'd think would tear the truck to pieces. These trails would shake the cab off an ordinary truck, but not our Chevy. Chevies are built to hold together longer."

■ No matter where you haul, you'll profit by the new toughness that's built into Chevrolet truck cabs for '60. You'll benefit from a cab that stands up to slam-bang runs over rough terrain, a cab that stays in A-1 shape years longer. Here are some of the ways in which Chevy assures this tight, maintenance-minimizing performance:

1. Tough new longitudinal sills reinforce the underbody; provide a solid foundation for cab sheet metal.

2. Extra-sturdy door openings—box-section pillars and sills assure lasting alignment. Doors stay weathertight with a minimum of maintenance.

3. New double-walled roof makes cab stronger and safer. Box-section pillars provide solid roof support.

There's a world of comfort for you, too. A wide seat, for instance, that softens the ride yet gives you extra support where it's needed. And there's more head room, hip room, shoulder room and leg room for rangy drivers.

First chance you get, visit your dealer and drive a new Chevy. Experience new Torsion-Spring Ride. Check up on Chevy's famous gas-saving 6's and V8's. Then you'll know, for sure, why you can expect thousands of extra miles out of a Chevy; why you can be sure of more work per day at least expense. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

BITUMINOUS-MIXING PLANTS and components are described in a 16-fold sheet published by the *Iowa Manufacturing Company*. Diagrams, photo-diagrams, and photographs describe the 25 production-balanced combinations of batch-mix and continuous-mix plants. **(301)**

TRAILERS offered by *Fruehauf Trailer Company* are pictured and described in a folder. The aluminum and steel trailer types include steel platforms, aggregate hopper dumps, and bulk cement tanks. Accompanying the folder is a postal card, which, when filled out, brings a 96-page Rand McNally road atlas. The atlas takes in most of the North American continent, and includes a U. S. Mileage chart, a radio guide, and maps of the national parks and larger U. S. cities. As it is a new, 1960 edition, it incorporates road changes made in the last year. **(302)**

DATA FOR SPECIFYING HEAVY-GAUGE PERFORATED METAL is outlined in a 40-page brochure from *Cross Perforated Metals Plant, National-Standard Company*. Such applications as screens, strainers, dryers, separators, supports, guards, ventilators, and drains for mining and quarrying, among other industries, are covered. **(303)**

THE 1,200 BBL. PER DAY, ONE-KILN, DRY-PROCESS CEMENT plant, started in July, 1958, by Cementos California, S. A., at Ensenada, Baja (lower) California, is described in a reprint from the August, 1959 issue of PIT AND QUARRY. The reprint is available from the *Kennedy Van Saun Manufacturing & Engineering Corporation*, the company was responsible for designing and equipping the installation. **(304)**

"TWIN-AIR" ROTARY SCREW TYPE AIR COMPRESSORS that deliver 6,900 to 19,400 cu. ft. at 110 p.s.i. are described in a 4-page folder available from *Atlas Copco*. **(305)**

TWO LINES OF WELDING EQUIPMENT are described in catalogs from *Air Reduction Sales Company*. Manual, semi-automatic, and automatic Heliwelding (Airco's tungsten-inert-gas welding process) components, as well as accessory equipment, are covered in Form ADC 709G. Also included in this 20-page booklet is data on holders for service on thin-gauge materials, and for heavy-duty welding of light- and medium-gauge metals.

Air Reduction's Aircomatic (gas-shielded metal-arc) welding equipment, both manual and automatic, are covered in a 20-page booklet, form ADC 717F. **(306)**

INSTRUMENT CONTROL COMPONENTS manufactured by *Minneapolis-Honeywell Regulator Company* are described in a series of specification sheets. In 4-page folder #153-23 the new Universal multipoint recorder which can be quickly changed from 2 to 24 points, and which allows quick range and actuation changes, is described. S801-4 describes the Electr-O-Line unit for position-proportioning control of motors or other actuators. S801-5 describes the Electr-O-Pulse unit for time-proportioning control of on-off final control elements such as contactors, solenoid valves, and motors. S801-6 describes the Electr-O-Volt unit for current-proportioning control of electric furnaces using magnetic amplifiers. **(307)**

MOTORIZED COUNTERWEIGHT VIBRATING FEEDERS, low headroom devices for feeding a wide variety of bulk materials at a uniform rate from various storage units and conveyors, are described in a 12-page booklet published by the *Link-Belt Company*. The machines are described by means of diagrams, tabulated specifications, and photographs. Capacities range from 5 to 1,700 t.p.h. **(308)**

"SELECTION AND USE OF PNEUMATIC CONVEYORS," an 8-page report published by the *General Conveying*

JUNE ***PIT AND QUARRY*** ***1960***

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

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more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

Division of *Fuller Company*, discusses the three basic systems, and the components required. Where to use pneumatic systems, and their advantages and costs are also covered. **(309)**

CARBON ARC WELDING, using a twin electrode arc torch manufactured by the *Arcair Company*, is described and illustrated in a new instruction manual released by Arcair. The torch, using metal stick electrodes, is used for electric arc welding. As the unit produces a high-temperature arc flame, gas torches do not have to be carried in the inventory. The booklet is free to readers. **(310)**

ALLISON AUTOMATIC TRANSMISSIONS for use with various kinds of trucks are described in a folder released by the *Diamond T Motor Truck Company* **(311)**

A LUBRICANT TO MAKE OPEN CHAINS LAST three times longer is described in a 4-page folder available from *The Whitmore Manufacturing Company*. **(312)**

MECHANICAL POWER TRANSMISSION equipment manufactured by *Dodge Manufacturing Company* is described in a new, general engineering catalog of 468 pages. The catalog lists both new and established product categories, and supplies drawings, specification data, and prices. Selection and application information is given on many pages. There is a separate section on general engineering data. The book is presented only on a selective basis to the key personnel of industrial concerns, mainly through Dodge dealers. Mail request should be made on company letterhead. **(313)**

"PACK SET," the resistance to initial flow which occurs during the storage and transport of cement, is discussed in two bulletins from the Rock Products Chemical Department, Dewey and Almy Chemical Division, *W. R. Grace & Company*. The titles are "Test for Pack Set" and "Pack Set: Cause and Prevention." **(314)**

PORTABLE POWER TOOLS—self-contained electromagnetic hammers and drills, pulsating magnet form vibrators, and vibrating concrete floats—are described and pictured in a 12-page brochure published by the *Syntron Company*. **(315)**

"VIBRATION PROBLEMS connected with blasting and other sources, their solution and control by scientific methods," the title of a folder published by the *Vibration Engineering Company, Incorporated,* describes the scope of this booklet offered to readers with vibration problems. **(316)**

A COMPLETE LINE OF OVER 35 TYPES OF RUBBER HOSE is presented in a new 24-page catalog released by the *Mercer Rubber Company*. Seventeen different kinds of fittings and couplings are illustrated on two pages. A chart to help with coupling selection is provided. Maintenance hints are also given. **(317)**

A LOW-COST, COMPLETE POWER PLANT is the claim that *Allis-Chalmers Manufacturing Company* makes for the gasoline-powered G-138, described in an 8-page brochure. Cutaway diagrams and specifications are included. **(318)**

CONTROL OF HOT, CORROSIVE DUST with glass-bag filters is explained in a 12-page bulletin from the Dracco Division of *Fuller Company*. Diagrams and photographs of installations at cement plants, along with data, describe use of the equipment. **(319)**

Material listed here is FREE unless otherwise noted.

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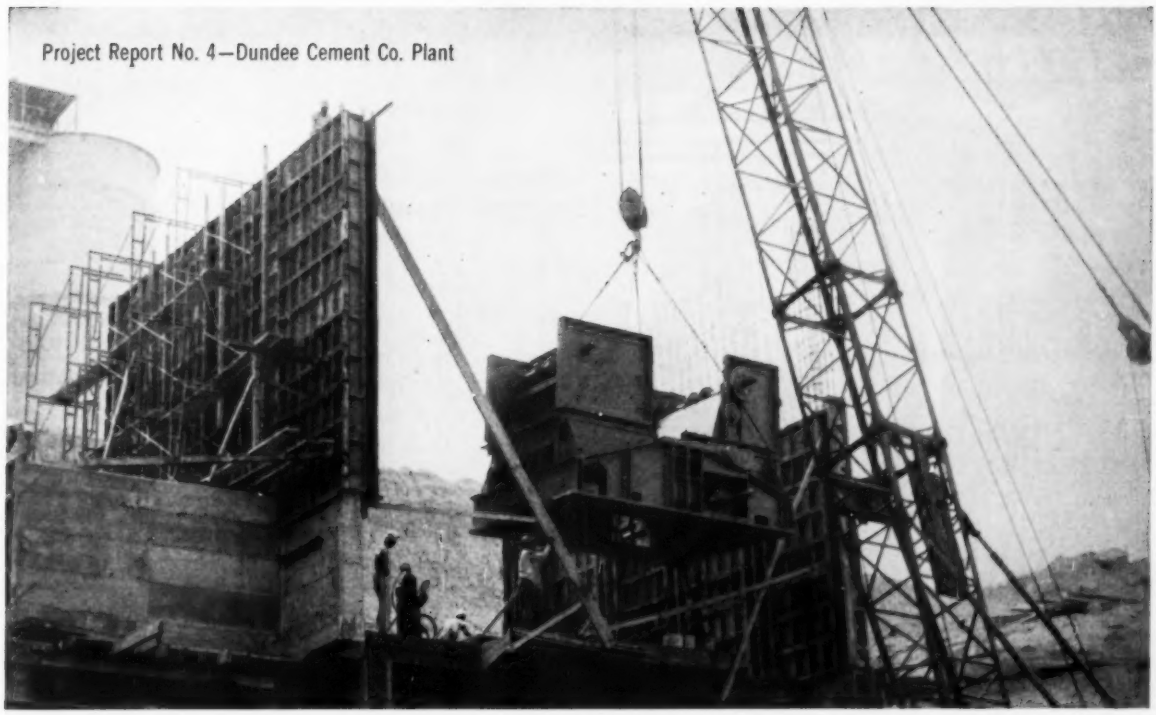
Project Report No. 4—Dundee Cement Co. Plant



Installing impactor-type hammermill which has capacity of 400 tons per hour.

DUNDEE PLANT FEATURES CEMENT INDUSTRY'S FIRST CONTINUOUS CLAY PREPARATION

This 42" gyratory crusher reduces blasted limestone from the quarry to 5½" top size crushed rock at the rate of 700 tons per hour.

This Eagle Iron Co. log washer, weighing 158,000 pounds, has four logs, each 52 inches in diameter and 35 feet long.

Many cost-saving, labor-saving new features are characteristic of the modern Dundee Cement Company Plant now producing in excess of rated capacity.

One unique feature is a continuous clay preparation process. This new method will save considerable time and money by eliminating the intermittent cleaning of equipment required in the conventional batching process.

All machinery used for clay preparation is housed in the primary crusher plant. The compact nature of equipment arrangement made it necessary to install machinery in successive stages as the plant was erected. The awarding of the building construction, as well as the machinery installation, to Darin & Armstrong provided for closer coordination and achieved earlier than scheduled completion at minimum cost.

(for Project Report #3 see April issue)

DARIN & ARMSTRONG, INC.

GENERAL CONTRACTORS

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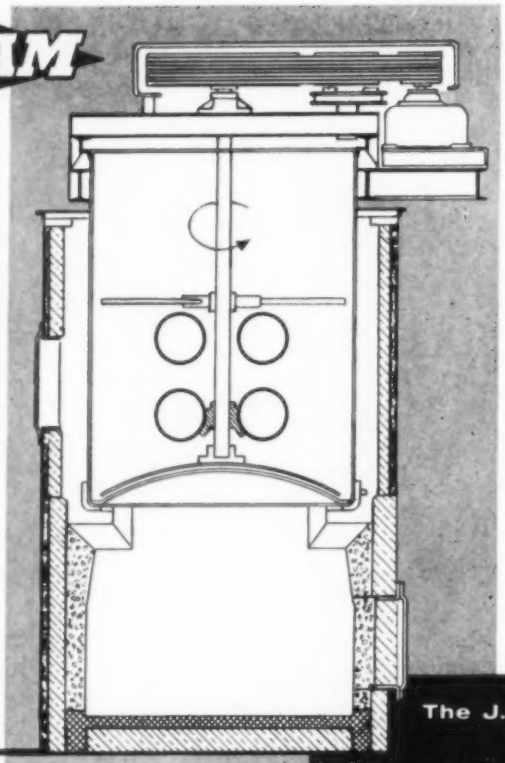
EHRSAM

OUTSTANDING SUSPENDED CALCINING KETTLE



Another step in the improvement of processing raw gypsum. The Ehrsam suspended-type kettle is designed to help you cut installation and operational cost.

The new method of suspension of the kettle requires less brick and refractory expense, yet maintains a high-quality product. The new V-belt drive provides a quieter operation with a greater percent of efficiency. The automatic takeup, incorporated in the drive, insures perfect tension of V-belts at all times.

This shock-absorbing-type drive eliminates the vibration so often found in the gear-driven type of kettle. For further information, phone, wire, or write . . .

The J. B. Ehrsam and Sons Mfg. Co.
Enterprise, Kansas

Sales Offices: Kansas City, Kansas; Phoenix, Arizona; Fort Worth, Texas; Ehrsam Pacific, Inc., San Francisco, California

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Weight indication available includes ball bearing poise weighbeams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information
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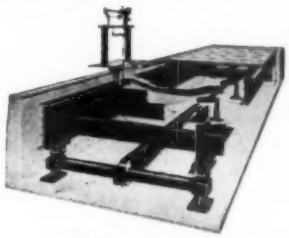
Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18′ x 9′ thru 50′ x 10′, wood or steel deck.



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Type S scales, pit installations, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform sizes 22′ x 9′ thru 60′ x 10′ for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.

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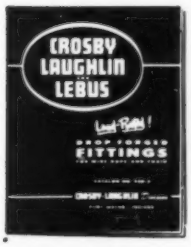

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Fittings For Wire Rope and Chain

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Grinding Balls

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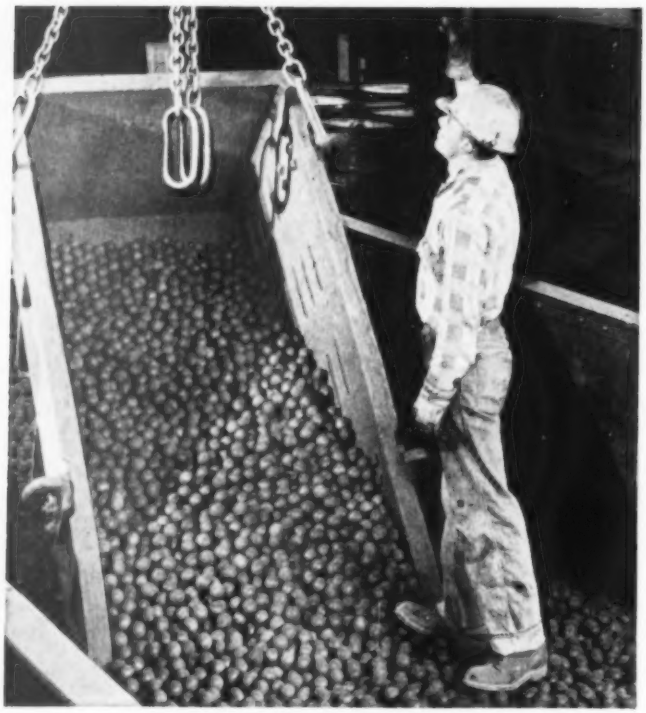

Moly-Cop Balls will give you better grinding at lower cost. What's behind this fine performance? Hardness, toughness and uniformity. Hardness to fight wear. Toughness to resist spalling and breaking. And uniformity of fine grain structure right to the core. Result: Moly-Cops keep their spherical shape longer. Fewer chargings. Less down time. Money saved.

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JUNE 1960

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36″ x 48″ or larger
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sectionalized frame preferred

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DIESEL ¾ yard Bucket
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This shovel was purchased new in 1946 and has been used to dig clay. In 1958, repairs to the Caterpillar diesel engine were made at a cost of $2,000.00, and $1,500.00 was spent on the shipper shaft.
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8" Jr. I Beam Frame Conveyors

Truss Frame Conveyors

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Any Length - Any Belt Width.

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

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CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
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14"	50'	2266	1181	$16.62
14"	85'	3445	1763	
16"	20'	1287	700	
16"	45'	2180	1128	
16"	60'	2715	1384	$17.10
16"	90'	3786	1897	
18"	25'	1507	830	
18"	45'	2261	1190	
18"	70'	3205	1641	
18"	85'	3771	1912	$18.03
18"	100'	4337	2182	
18"	130'	5469	2723	
20"	25'	1547	871	
20"	60'	2940	1546	
20"	75'	3536	1836	$19.30
20"	90'	4133	2125	
24"	25'	1622	922	
24"	45'	2479	1335	
24"	70'	3550	1852	$20.68
24"	100'	4835	2473	
24"	120'	5692	2886	
24"	150'	6977	3507	
30"	50'	2969	1591	
30"	70'	3948	2054	$23.17
30"	90'	4928	2518	
36"	25'	1854	1105	
36"	45'	2915	1623	$25.91
36"	60'	3711	2012	
36"	100'	5832	3048	

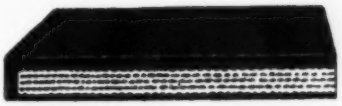
Other lengths and belt widths priced upon application.

BONDED 30" DEEP TRUSS CONVEYORS also built in heavy duty Portable Models. Available with Screen and Feeder and with mast or mastless type undercarriage and hydraulic powered mechanism. Lengths to 60 feet and belt widths through 30 inches. Equipped with Tow Hitch for easy moving from one job-site to another.

PRICED FROM $2365.

TESTED CONVEYOR BELTING *

WE PAY FREIGHT ON 200 POUNDS OR OVER. AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.



MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty, 28 oz. duck, ⅛" top x 1/32" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	Sale Price Domestic Per Ft.
14"	4	$2.94
16"	4	3.09
18"	4	3.42
20"	4	3.95
24"	4	4.43
30"	4	5.42
36"	4	6.43

MAJOR C-BEE BRAND: SMOOTH SURFACE: 15# to 17# Friction Pull. 1600# to 2400# Cover Tensile. 32 oz. duck. Skim coat between plies. Heavy Duty belt for severe service and abrasion resistance.

Width	Ply	Top Cover	Bottom Cover	Sale Price Imported Per Ft.
24"	5	1/8"	1/16"	$5.33
30"	5	1/8"	1/16"	6.59
36"	5	3/16"	1/16"	8.45

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty 28 oz. duck, ⅛" top x 1/32" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	Sale Price Domestic Per Ft.	Sale Price Imported Per Ft.
14"	4	$3.18	$2.98
16"	4	3.60	3.14
18"	4	3.98	3.47
20"	4	4.54	3.99
24"	4	5.14	4.50
30"	4	6.31	5.58
36"	4	7.64	6.50
24"	5	6.01	5.25

MAJOR B-X SMOOTH SURFACE: 20# to 24# Friction Pull. 3400# to 4000# Cover Tensile. A heavier duty belt with ⅛" top x 1/32" bottom covers. For higher abrasion resistance and handling of materials where more strength is required.

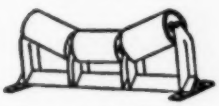
Width	Ply	Sale Price Domestic Per Ft.	Sale Price Imported Per Ft.
16"	4	$3.93	$3.31
18"	4	4.37	3.64
20"	4	4.98	4.02
24"	4	5.63	4.71
30"	4	6.92	5.80
36"	4	8.16	6.84

*** All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1263

BONDED IDLERS & RETURN ROLLS FOR UTMOST ECONOMY ON THE JOB



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50
1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED CONVEYOR PARTS

Write For Bulletin #1138

Self Aligning Idler **$60.75**

Rubber Disc Impact Idler **$69.75**

V-Wing Pulley **$71.00**

Screw Takeup and Frame **$37.25**

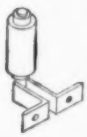
Self Aligning Return Roll **$49.25**

Holdback **$99.00**

Gravity Takeup **$413.00**

Head and Tail Section **$149.00**

Carrying Belt Guide Idler **$29.00 Per Pair**



Return Belt Guide Idler **$15.50 Per Pair**

WRITE US FOR YOUR ELEVATOR BELT AND CHUTE LINING REQUIREMENTS

ELEVATOR BELT is of heavy duck carcass with smooth tough rubber or friction surface on one or both sides. Can be furnished with or without bucket holes punched and cemented. Write for full information and prices. **CHUTE LINING** is of high-tensile, abrasion-resisting quality. Recommended for Chute and Launder Lining, Conveyor Belt Scrapers, Conveyor Skirt Boards, Die-Press or Bumper Stock, Hoppers, Bins and other metal surfaces exposed to the action of abrasion materials.

Bucket Elevator & Conveyor Chain

C102B Cotter Pin Combination Malleable Iron and Steel Elevator Chain with K-2 attachment every fourth link. Consumer List Price $3.42 per foot. YOUR PRICE **$2.56** per foot.

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213 or TEmple 7-4519**

110 BELLEVUE Mfrs. of Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators **COLUMBUS 7, OHIO**

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EQUIPMENT

1—Model B. Completely rebuilt with all latest improvements. 1½ years since new. Cummins power.

1—Model C. Very good condition. Cummins power. Also one with GM power.

3—Tournatractors. All in good condition, with down pressure and bull-dozers.

Other Equipment

S-12 Euclid. Very good condition.
International 2T75. Good condition.
Koehring 205 Dragline rebuilt from tracks up.
Insley K-12 Crane on Diamond T 6x6. Very good.
Lorain TL20 Dragline. Gas engine.
Int. Model 350 Utility Tractor with Henry Hoe and Loader. Excellent.
Telsmith 42"x43' Portable Apron Feeder.
Telsmith 4x12 Double Deck Screen.
Simplicity 4x10, 4 deck Screen.

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USED PIPE

3" to 24"

LARGE STOCK

HUDSON PIPE & SUPPLY CO.

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BAYONNE, NEW JERSEY

As is, where is, subject to prior sale.
1—3500 Manitowoc and 1—P&H 955A complete shovel fronts with 2½ Cu. Yd. bucket.

J. L. SHIELY COMPANY
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Telephone - Midway 6-8601

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Electrical Foreman for a cement plant. Ability to supervise, plan and maintain equipment. Furnish reference, experience and salary expected.

NORTH AMERICAN CEMENT CORP.
HOWES CAVE, N. Y.

FOR SALE

15 x 36 Pioneer Jaw Crusher
40 x 22 Austin-Western Roll Crusher
4 x 8 Pioneer Double Deck Screen
4—30 ton Steel Bins, nested.
Above available with motors and drive

POWER EQUIPMENT COMPANY
Box 2311 Knoxville, Tenn.

ROTARY DRYERS: One 3' x 34 ft., ⅜" shell, complete with 7½ H.P. geared motor, exhaust fan, etc. One 9 ft. by 80 ft. complete.

KILN: One Rotary Kiln 4½ ft. dia x 40 ft. with rotoclone and 7½ H.P. motor, 3 H.P. motor and speed reducer, classifier, kiln burner, etc.

JAW CRUSHER: One 40" x 42" Allis Chalmers with 150 H.P. slip ring motor and controls, V-belt drive, with or without one heavy duty Apron Feeder size 42" x 14'3" with motor, speed reducer, push button control.

DREDGE: One 10" Diesel electric Dredge with 34' ladder, 200 yds. per hour capacity, excellent condition, reasonable.

SINGLE DRUM HOISTS:
1—84" dia., 63" face, 1⅜" rope, 150 H.P.
1—86" dia., 80" face, 2" rope, 250 H.P.
1—84" dia., 63" face, 2⅛" rope, 300 or 450 H.P.
1—84" dia., 102" face, 2" rope, 350 H.P.
1—96" dia., 74" face, 1½" rope, 800 H.P.

DOUBLE DRUM HOISTS:
1—72" dia., 40" face, both drums clutched, 1¼" rope, 880 FPM, 500 H.P.
1—Nordberg double clutched drum, 10' dia., 10' face, 1½" rope, 1250 H.P., 1200 FPM.
1—10' dia., 74" face, direct current 600 volt motor, 1500 H.P., 64 RPM, 1¾" rope, one clutch, 2000 FPM.

All the above hoists with post brakes, Lilly controls, 2200 volt motors and controls. Other hoists 100 to 1500 H.P. for shaft or slope.

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1—D8 Caterpillar Tractor with Dozer and L. P. Scoop—2U Series.
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2—P&H 255 Combination Cranes, Shovel and Draglines.
1—Rogers Jaw Crusher 15-24.

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BEST BELT BUYS

Heavy duty, 2500-3000# cover tensile, 16-19# friction pull. Brand new, factory fresh.

		LIST	SELL
14" 4 ply 28 oz.	1/8"x1/32"	$4.48	$2.60
16"	1/8"x1/32"	$5.06	$2.93
18"	1/8"x1/32"	$5.61	$3.26
18"	1/8"x1/16"	$5.92	$3.44
20"	1/8"x1/32"	$6.14	$3.56
24"	1/8"x1/32"	$7.22	$4.18
24" 5 ply 28 oz.	1/8"x1/16"	$8.78	$5.09
30" 5 ply 28 oz.	1/8"x1/16"	$10.19	$6.31

Many other sizes. Samples on request. For delivery from New York or Midwest Warehouse, call collect:

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ROTARY DRYERS, KILNS, COOLERS, ROD MILLS, BALL MILLS, TUBE MILLS, CONE, GYRATORY, JAW & ROLL CRUSHERS, LOCOMOTIVES, DERRICKS, AIR COMPRESSORS.

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600'—9" Screw Conveyor Complete Ends, Hangers & Gearmotors.
6–Centrif. Discharge Encl. Elevators, 6" Buckets, H-78 Chain.
24" x 95' Truss Frame Conveyor with Walkway, All New.
14" & 16" Used Rex Idlers.
20" Roller Bearing Trough Idlers.
30" to 48" Used Robins Idlers.
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New Universal Screens in Stock.
Jeffrey Traylor #4 Vibrating Feeder with controller.
New Holland Plate Feeder 24" x 60".
Iowa 25 Yd. Portable Crushing Plant.
Acme Jaw Crusher 14x26" Steel Frame.
Farrel Lab. Jaw Crusher 6" x 2".
New England Jaw Crusher 14" x 28".
Sturtevant #1 Rotary Crusher.
2—Lancaster "Iroquois" Pug Mills.
6' x 32' Heatherington Dryer, 50 H.P.
Bucket Elevators All Sizes Built to Order.
Belt Conveyors All Sizes Built To Order.
Largest Stock Reducers on East Coast.
Motors Up to 50 H.P.

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80-Ton Whitcomb Diesel Electric Locomotive
Also
All Weights Relaying Rail, and Accessories

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GUARANTEED REBUILT MOTORS
220/440 V. 60 Cycle—3 Phase

HP	Make	Type	Speed
350	West B.B. Drip	CS-22556H	1200
250	El. Dyn. T.E.F.C.B.B.	KNX	1800
200	G.E. B.B. Open	K-6335	900
150	L.A.B.B. Splash	FX-1365	900
150	A.C.T.E.F.C.	AZ-3-88	900
125	Reliance B.B. Open	AA-504	3600
100	West T.E.F.C.B.B. XP	CS-770	1200
100	Rel. T.E.F.C.B.B. XP	23E8	900

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Large line of motors, control equipment, AC & DC Generators, MG sets and transformers.

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All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

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220 E. Douglas Avenue Fort Wayne, Ind.

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1—13" x 30" Type B Farrel-Bacon Crusher
1—#1030 Good Roads Portable Crushing Plant—96 H.P. Diesel Engine, Screen & Elevator
1—Apron Feeder 36" x 16'-0"
2—Link-Belt Vibrating Screens, Type NP-315
1—Link-Belt 3' x 5' Foundry Shakeout Screen—New
1—Syntron F-200 Vibrator
1—Link-Belt Slope Hoist, 48" x 48" Drum, Roller Bearings, Gear Reducer
1—3¼ Yd. Clamshell Bucket—Blaw-Knox, Size 734
1—1016A Gruendler Jaw Crusher, Vee Belt Drive—Never used.
1—19"x20" Bonded Scale Co. Double Roll Crusher, Corrugated Shells, Vee Belt Drive—Never used.
1—36" x 20' Revolving Screen
1—36" x 11' Revolving Screen
1—30" x 14' Revolving Screen
New All-Steel & Manganese J. & H. Hammermills 5½" x 18"
1—8' x 18" Hardinge Conical Ball Mill—New Gear
We build open and totally enclosed bucket elevators and belt conveyors to suit your needs.
Large stock chain, sprockets, buckets and conveyor pulleys—new and used.

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Bucyrus-Erie "Winkie" diamond drilling equipment, complete with water pumps, core bits, drilling rods, etc. This equipment like new, used only 30 days.

Pacific States Steel Corporation
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BUY *United States* SAVINGS BONDS

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Three-year-old feeder-crusher unit complete—motors, drives, controls, chutes, grizzley, platform, etc. May be seen in operation until June—Available in July. Cedarapids Equipment. Jaw crusher 32" x 40"—Serial No. 18238. Feeder 42" x 14'. Serial No. 18238. Priced at $20,000 loaded.

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Hose—Suction and Discharge. New. 1 inch to 6 inch.

Airport Landing Mat—Ex. cond.
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ELECTRICAL POWER EQUIPMENT

REBUILT SLIP RING MOTORS

3 ph. 60 cy. 220 or 440 volts
(*2200 volts or higher)

HP	RPM	MAKE	TYPE
1500	514*	Al.-Ch.	Mill Type
1300	360*	Al.-Ch.	Mill Type
900	160*	Al.-Ch.	Mill Type
600	1800*	Gen. Elec.	M-6345S, Dppf. New
500	1200	Gen. Elec.	M-6345Z, Dppf.
400	720	Gen. Elec.	MT-57 3Y
350	900*	West.	CW
350	1800*	Al.-Ch.	ARYW (2)
300	1800	Cr.-Wh.	SR
300	600	Gen. Elec.	I-M-17A
300	600*	F.-Morse	HV-H300D, BB
300	450	Gen. Elec.	I-M, 2 or 3 brg.
250	720*	Gen. Elec.	I-M, 17A

SQUIRREL CAGE MOTORS

3 ph. 60 cy. 220 or 440 volts
(*2200 volts or higher)

HP	RPM	MAKE	TYPE
1250	3600*	Al.-Ch.	ANX
800	1800	West.	CS-34C
600	600*	West.	CS-44-C15 Dppf. (2)
500	1200	Gen. Elec.	I.K.
400	1800*	L. Allis.	BB, Sppf.
400	1800	West.	BB, Dppf.
400	1200	Gen. Elec.	K TP-565
350	3600	Cr.-Wh.	SC, Dppf.
300	1200	Gen. Elec.	KT-559, Dppf.
300	600*	West.	CS-39A
300	600*	West.	CS-1002
300	400	Elliott	Design 40Y03
250	1800	Gen. Elec.	KT-559
250	1800	West.	CS-81205, TEFC. Xpf.

SYNCHRONOUS

3 ph 60 cy A.C.

HP	RPM	MAKE	REMARKS	VOLTS
900	1200	Gen. Elec.	TS, 1.0 PF	2300
300	357	Ideal	SMM, .8 PF	4000/2300
275	450	Gen. Elec.	ATI, 1.0 PF	2300
250	1200	Al.-Ch.	1.0 PF	440(4)
225	300	Gen. Elec.	TS-6244D, 1.0 PF	220
225	360	Elec. Machy.	1.0 PF	440
225	720	Al.-Ch.	.8 PF	2200/440
210	1200	Gen. Elec.	ATB-32, bus. exc.	400
200	1800	Gen. Elec.	TS-7559, dir. con. exc.	440
190	720	Elec. Machy.	1.0 PF	440
150	300	West.	HR, 1.0 PF	2200
150	1200	Al.-Ch.	1.0 PF	440
150	1200	Elec. Machy.	.8 PF	2200/440
125	277	Gen. Elec.	TS-6214, 1.0 PF	2300(3)

M. G. SETS

KW	Make	Motor A.C.V.	Generator D.C.V.
1000	West.	4160	250
600	G.E. (3 unit)	2300/440 syn.	125/250
500	West.	2300/440 syn.	125/250
400	Al.-Ch.	2300/440 syn.	125/250
300	West.	2300/480 syn.	250
200	Reliance	2300/440 syn. TS	500
200	Gen. Elec.	2300/440 syn. TS	250/275
200	Ridgeway	2300 syn.	250
150	Al.-Ch.	220/440/220	250
150	West.	2300/440/220 syn.	125/250
125	West.	2400/480 syn.	250
125	G.E.	2400/480 syn.	250
100	West.	2300/4000 syn.	250/275
100	G.E.	2300/4160 syn.	250

D. C. MOTORS

37½/75 575/1150 Reliance CD-1342Y(450V.)
230 Volts

HP	RPM	MAKE	TYPE
300	575/1150	West.	CB-509-4
200	700	West.	SK-201
175	700	G.E.	FLC-11
150	380/1000	G.E.	MCF
150	1150	G.E.	RC-37 (4)
150	720	G.E.	RC-39A
150	400	West.	SK-201
125	870	G.E.	CD-1343,dppf.
100	2500	G.E.	RC-34
100	400/800	G.E.	MPC-6
100	575/1150	G.E.	CD-147
100	1150	West.	SK-163
100	750	G.E.	CD-135
100	575	G.E.	CD-147

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6—Vulcan 6'6"x60'x½" Rotary Kilns
1—Mosser 4'x47'x5/16" Rotary Dryer
1—Traylor 8'x11' Steel Lined Ball Mall
2—Beth. Fdy. 7'x24' Compeb Mills
2—Allis-Chalmers 6K; 8K Gyratorys
1—Non-Clog 36"x50" Hammermill
1—Barber Greene Model 82A Loader

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3'x6' Horiz., 4'x9'x12" Vert. Puggers
Komarek-Greaves 27"x24" Briquet Presses
6'x25'; 6'x50' Louisville Rotary Dryers
7'x50'; 8'8"x70' Ruggles-Coles Dryers
Dixie #5060 Mogul Hammermill
15"x8" to 24"x18" Jeffrey Hammermills
Raymond 3 Roll #3036 Hi-Side Mill
Raymond #50, #40 Impact Mills
6—Tyler Hummer Screens 4'x8', 4'x6'
4—Robinson Saw Tooth Crushers
535'—24" Troughing Belt Conveyor
Bucket Elevators 45' to 90' Centers
BOILERS, COMPRESSORS, GENERATORS

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ROCK PROD. EQPT. DIV.
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SPECIAL!

2—American heavy duty, band type friction drag-scraper hoists. Cap. rear drum 5000# @ 600 RPM. Front drum 12,000#. Inhaul speed 250 FPM. Excellent condition.

SPECIAL PRICE (no motor) — $3,750.00
With 125 HP Elec. Motor — $6,500.00

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Box 43P, Coraopolis, Pa. (suburb of Pittsburgh)
30P Church St., New York 7, N.Y.

FOR SALE
40" x 48" JAW CRUSHER
Also other sizes of Jaw, Cone and Gyratory Crushers, Cement and Ice Plants, etc.
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MAY WE QUOTE YOU ON DESIRABLE EQUIPMENT?

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Pit and Quarry's Broadcast pages are read each month by thousands of men in the industry. Some of them are probably looking for exactly the machine you're no longer using and would like to sell.

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YOU CAN SAVE MONEY AND MAKE A PROFIT WITH THIS EQUIPMENT:

QUARRY EQUIPMENT

Cedarapids 2236 primary jaw crushing plant.
Cedarapids Jr. tandem crushing plant, 1036 jaw.
Cedarapids portable screening unit.
Universal 2436 jaw crusher. Reconditioned.
Austin-Western 1536 jaw crusher. Reconditioned.
Cedarapids 1036 jaw crusher. Reconditioned.
Cedarapids 1216 twin jaw crusher. Reconditioned.
2—Cedarapids 4033 hammermills. Rebuilt.
Cedarapids 3033 Hammermill.
Cedarapids 2033 Hammermill. Rebuilt.
Cedarapids 4' x 14' 2-deck screen. New warranty.
2—Cedarapids 4'x12', 2-deck screens.
Robins 4' x 9' triple deck screen.
Telsmith 3' x 8', 3-deck inclined screen.
Aggregates 4' x 14', 3-deck inclined screen.
54" dia. x 23' lg. revolving screen.
1—Cedarapids 42"x10' apron feeder.
Cedarapids 30-S, 2-compartment charging hopper, apron feeder, bucket elevator. New.
McLanahan & Stone 8'x30' double log washer.
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8'x12', 8'x18', 12'x22' bins in stock.
18", 24", 30", 36" conveyors & belting.
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SHOVELS AND CRANES

Lorain L-50J, 1-yd. diesel crane-hoe.
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Bucyrus-Erie 10B, ⅝-yd. gas shovel.
Lorain MC-414, 20-ton Moto-Crane. Reconditioned.
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Lorain MC-254, 15-ton moto-crane.
Lorain TL-20, 10-ton moto-crane.

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1—Caterpillar D-6 with cable angledozer.
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3—Bucket Elevators, up to 40' high

JUST PURCHASED

3—National Iron 10' dia. x 78' long rotary dryers, ¾" shell

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11' x 155' Traylor Kiln, ¾" shell
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8'8" x 70' Hardinge Dryers, ⅝" shell
8' x 115' United Kiln, ½" shell
7'6" x 63" Kiln, ½" welded shell
7' x 50' Allis Dryer, ⅝" shell
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6' x 7' x 100' Kiln, ½" shell
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CONICAL, Hardinge 4' x 16" ball
CONICAL, Hardinge 7' x 36" pebble
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BALL-TUBE, Allis-Ch. 5' x 22', wedged liners, 150 HP

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CONE, Symons 3' shorthead, 50 HP
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JAW, BUCHANAN 13" x 24", 50 HP
JAW, 18" x 9", 20" x 6', 36" x 15"
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111M Marion Shovel, 4 yd.
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CRUSHERS & LOADERS

Traylor 14" Bulldog Gyratory Primary, Serial #28939, minimum setting 2¼", main bearings rebabbitted, complete with outboard bearing, pulley, "V" belt drive, no power $3,925.00

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Never been used.
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Phone AXminster 6-9661

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2—Hardinge 10' x 48", 8' x 36" Conical Ball Mills, motor driven.
1—Denver 3' x 5' Continuous Ball Mill.
1—Telsmith Red. Crusher No. 46, 50 H.P.
2—Kennedy #6 Gyratory Crushers, 50 H.P.
5—Jaw Crushers 12" x 18" to 36" x 48".
1—Penn. Non-Clog Swing Hammermill, size 5060, Hopper opening 47" x 60", cap. 200-275 tons per hour. UNUSED.
1—Penn. Super-Thor Hammermill, size SXT-13, 250 H.P.

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1—18' dia. Raymond Double Whizzer Separator with 100 H.P. motor.
1—14' dia. Raymond Double Whizzer Separator with 100 H.P. motor.
1—10' dia. Raymond Single Whizzer Separator with 100 H.P. motor.
1—Link Belt 6' x 14' double deck Vibrating Screen.
1—Tyler Hummer Screen 4' x 10'.

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1—Fuller-Kinyon Conveying System, type H257, 100 H.P.
2—Fuller-Kinyon Conveying Systems, type 10-B-No. R, 75 H.P.

WIRE PHONE WRITE

BRILL EQUIPMENT COMPANY
35-59 Jabez Street
Newark 5, N. J.
Tel.: Market 3-7420

10" Morris Flurry Sand Pump with Motor
60 HP Oil Fired Boiler & Stack—good
D-17000 V-8 Caterpillar Diesel Unit
600 CFM G/D Portable Air Compressor
3'x8' 2-deck G/D Vibrating Screen
50'x24" Conveyor on 6" Channel
20 TPH Raymond Mill & 100 HP Motor
125 & 150 HP Slow Speed Motors

H. & P., 6719 Etzel, St. Louis 30, Mo.

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1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, 7/8" shell.
1—Rennenberg 6' x 60' Rotary Kiln.
2—Abbe 5' x 16' Ball Mills.
3—Bucket Elevators; 125', 32', 30'.
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200'—Screw Conveyor, 9" and 12".

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Priced For Quick Sale

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1—Raymond 16' Double Whizzer Separator, 75 HP.
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1200'—9" and 14" Screw Conveyor.
15—Bins from 6' x 7'6" x 12', to 17' x 20' x 12'.
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Telsmith Super Scrubber
Syntron Grizzley Feeder F-86
10" Peerless Turbine Pump, 150 h.p., 200 GPM

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New Murphy-Diesel 100KW MOTOR GENERATOR 3/60/240V/300 AMP. 1.5 KW Exciter. Complete.

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1—Allis Ch. 9' x 130' Rotary Kiln, 3/4" shell.
2—Allis Ch. 7'6" x 7' x 125' Rotary Kilns.
1—Bonnet 5' x 40' 3/8" shell Rotary Kiln.
1—Traylor 8' x 80', 5/8" shell.
1—Vulcan 8' x 80', 1/2" shell.
1—Vulcan 7' x 80', 1/2" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'.
1—Rennenberg 6' x 50', 3/4" shell.
1—Ruggles Cole 5' x 30', 3/8" shell.
1—Allis Chalmers, 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
1—3'x36', 3/8" shell.
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35-59 Jabez Street Newark 5, N. J.
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25-ton Industrial Brownhoist with D13000 Cat. diesel & 60 ft. boom

DIESEL LOCOMOTIVES
7—25 ton, 4—45 ton, 1—65 ton, 1—80 ton, 2—100 ton General Electric
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300—1½, 3, 5, 16 & 20 yds. cap.

20-TON STIFF LEG DERRICK
96' boom, 40' mast, 50' B. legs, 39'10" sills, 16' bull wheel

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2—5' x 8' Kennedy Van Saun Air Swept Tube Mills
7' x 15' Marcy Grate Discharge 300 HP motor

HARDINGE CONICAL BALL MILLS
4'6" x 16" 6' x 36", 8' x 36", and 10' x 48"

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6' x 12' Hardinge EPD 200 HP
7' x 15' Marcy Open End 300 HP motor

TUBE MILLS
6' x 15' Allis Chalmers Grate Discharge
7' x 18' Patterson with motor & reducer
7' x 24' Bethlehem and Foundry

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5060 Dirie "Mogul" 500 HP
2—HMH-04-NC Hammermills, traveling breaker plate
3650 Dixie Non-Clog 250 HP
3XE Gruendler 30" x 48"
8XT-14 Pennsylvania 400 TPH

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10" x 16" Pioneer, bronze bearings NEW
14" x 28" New England Road Machinery
22" x 36" Cedar Rapids Roller bearing
30" x 36" Traylor Type "H"
32" x 40" Cedar Rapids with feeder & motor
36" x 42" Farrell Bacon (In Canada)
48" x 72" Buchanan Type "C"
56" x 72" Traylor (4 piece frame)

ROLL CRUSHERS
24" x 16" Cedar Rapids Double Roll
30" x 18" Cedar Rapids Double Roll
18" x 18" McLanahan & Stone Double Roll
42" x 16" Allis Chalmers Double Roll

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No. 1 Sturtevant
No. 19 Kennedy Van Saun
No. 122 Allis Chalmers Hydrocone
No. 28 Telsmith Intercone
2' Symons Standard Cone
No. 37½ Kennedy Van Saun
4'-0" Traylor Type TY

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12" Kennedy Van Saun
16" Allis Chalmers Superior McCully
20" Allis Chalmers Superior McCully (2) new 1948
25B Telsmith Primary Breaker
No. 11 McCully

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No. 2A Cedar Rapids Secondary, 24" x 16" Rolls, 3' x 8' 1½ deck screen, 40TPH
No. 61E Austin Western, 10" x 24" Jaw, 3' x 10' Screen, and electric motors

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24" x 95' H.R. 42" Truss, with feeder Frame

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4' x 8' & 5' x 10' Symons Rod Deck
4' x 10' Hewitt Robins Double Deck
5' x 12' Hewitt Robins Double Deck

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7' x 30' Eagle Twin Log Washer
84" x 12' Telsmith Super Scrubber
12'0" Link Belt Dewatering Rotoscope UNUSED
8' x 48" Hardinge Conical Scrubber
Size 10 Sand Settling Tanks (2)

ROTARY DRYERS
5' x 30' Ruggles Cole Model XA-8
5'6" x 60' Dryer or Cooler
8' x 60' reconditioned, ½ welded shell
3—10' x 78'—¾" shell

ROTARY KILNS
One 3' x 3' Rotary Kiln
5' x 160' Allis Chalmers with burner
6' x 72' 5/8" Shell, gear train drive

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Dryers — Kilns — Crushers

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60 E. 42nd St. New York 17, N. Y.
Tel.: MU. 2-3075 or MU. 2-1898

3—10' x 78' Dryers—2', 3', 4', 5½ Symons and Telsmith Cone Crushers—3648, 4042, 4872 Jaw Crushers and smaller sizes—Jeffrey 2448 DTF Vibrating Feeders—other types of Feeders—Eagle Fine & Coarse Material Washers—Dixie Non-Clog moving plate Hammermills—Asphalt Plants—Jaw—Cone—Gyratory—Roll Double and Triple—Hammermill and Impact Crushers—Ball—Rod—Tube Mills—Screening, Washing and Crushing Plants, Classifiers, Compressors, Conveyors, Cranes, Drills, Dump Cars, Dredges, Feeders, Hoists, Motors, Generators, Kilns, Dryers, Locomotives, Pumps, Screens, Shovels, Draglines, Transformers, Euclid Trucks.

STANLEY B. TROYER EQUIPMENT CO.
Box 97 Phone 500 Crosby, Minnesota

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So be extra careful this year. Use your car ash tray. Douse your campfires. Be sure all fires are out, dead out. Be sure *you* don't cause a shameful forest fire. (Every year, some people do. 9 out of 10 forest fires are still man-caused.)

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Like other American business firms, we believe that business has a responsibility to contribute to the public welfare. This advertisement is therefore sponsored in cooperation with The Advertising Council and U. S. and State Forest Service

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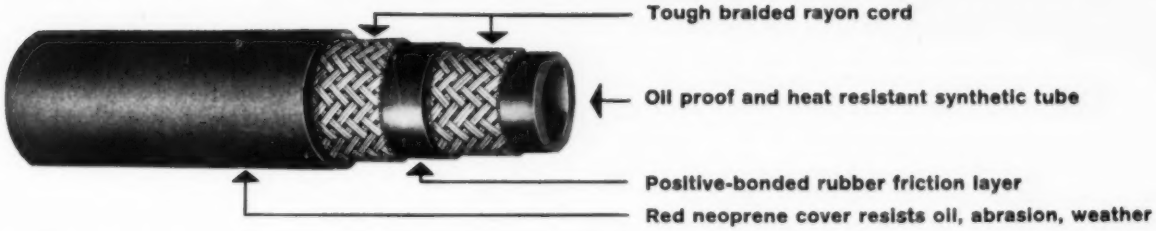
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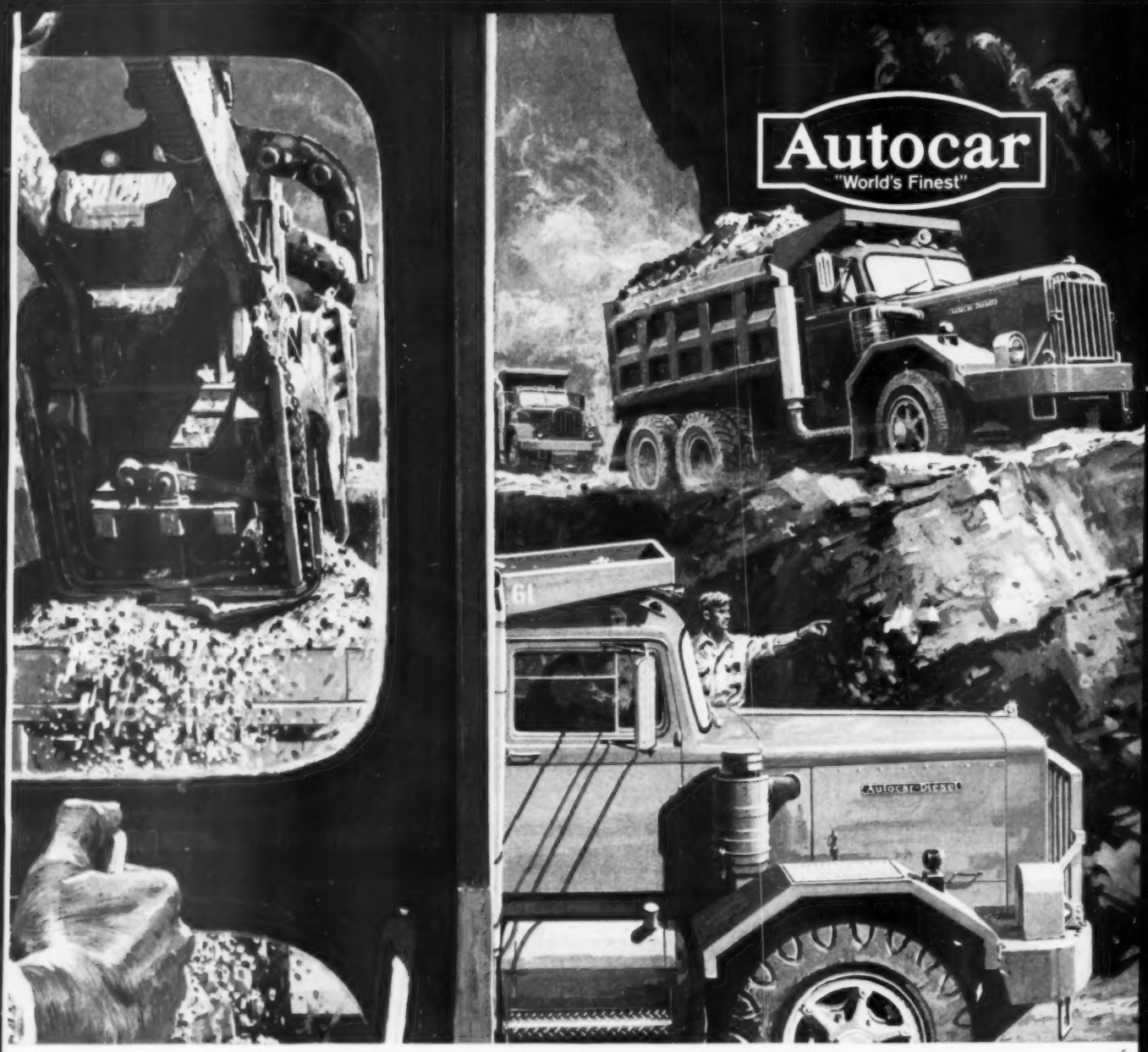

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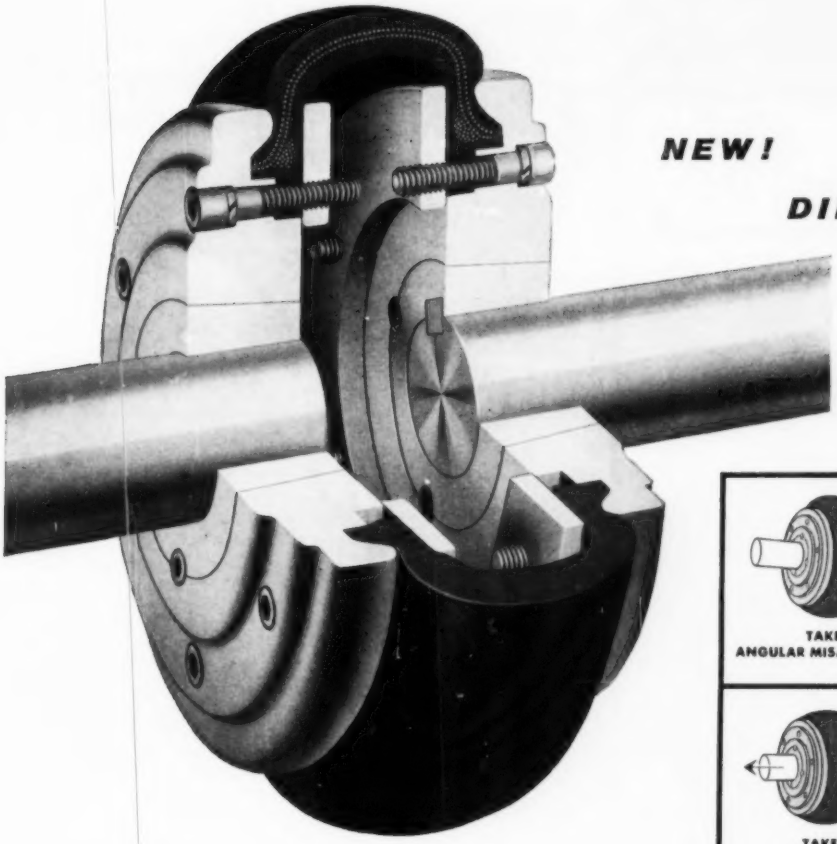

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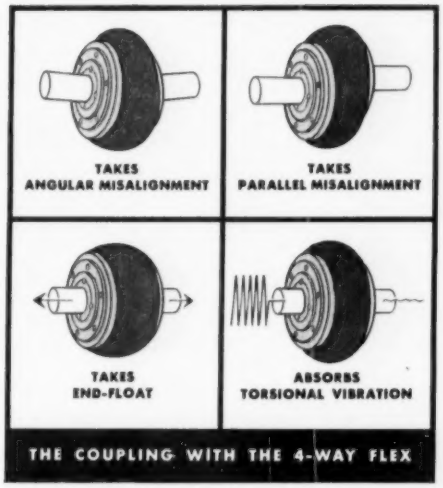

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THIS coupling "swallows up" shaft misplacements. It automatically compensates for end-float, parallel misalignment, angular misalignment *or any combination of all three.* Moreover, it cushions the stresses of shock loads. And it absorbs torsional vibration—reducing noise and protecting machinery from vibration's destructive forces.

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Para-flex Couplings are stocked by Dodge Distributors in popular transmission sizes. They are available from factory stock in capacities up to 2000 hp at 1080 rpm. Call your distributor for a coupling to *make your own test.* You'll witness something revolutionary!

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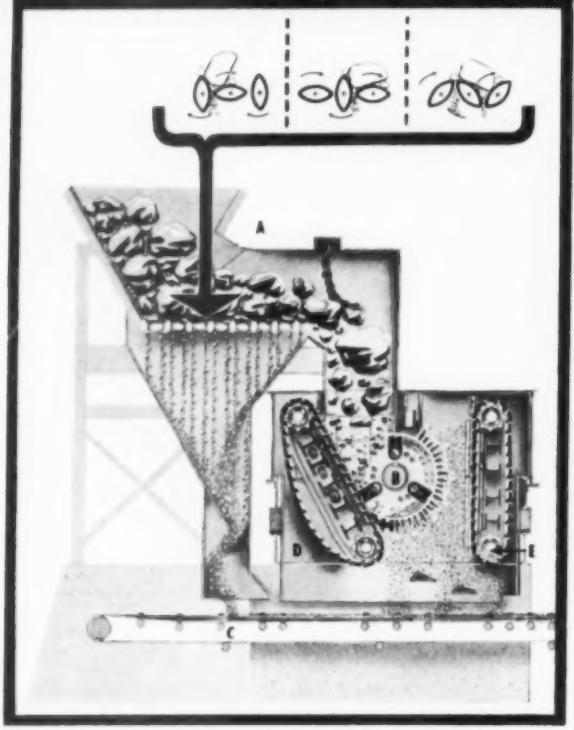

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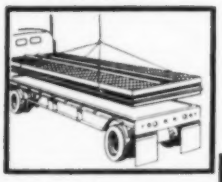

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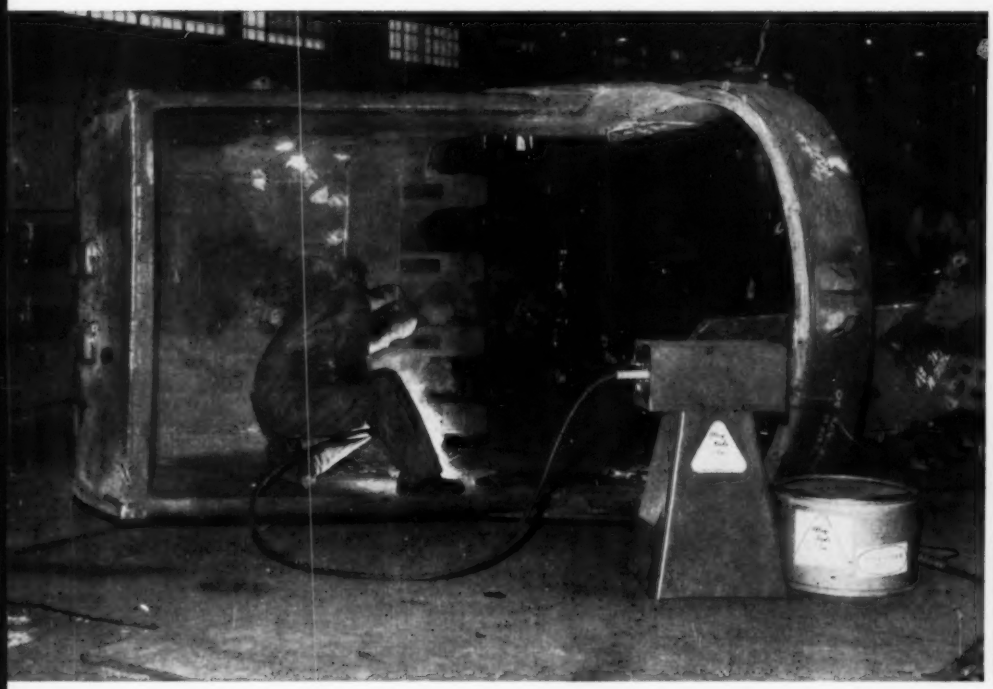
NEW WEAR-O-MATIC WH Produces High Strength Manganese Attachment Welds Equal to 308 Stainless For PAGE ENGINEERING COMPANY



The Page Engineering Co. was founded in 1903 by Mr. John W. Page who originated the dragline method of digging. Today Page Engineering is the nation's leading manufacturer of dragline buckets, walking draglines and other equipment used in dragline operations.

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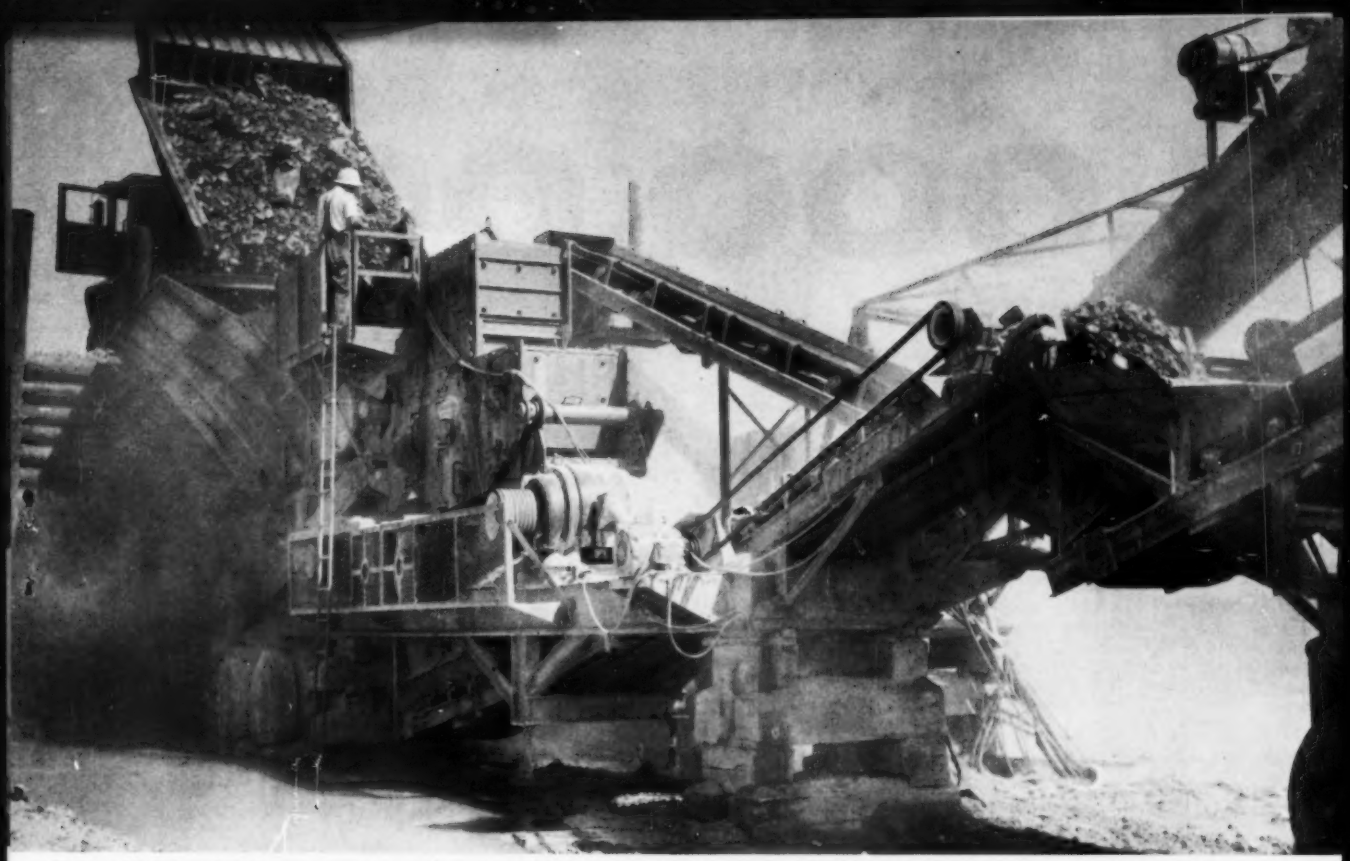

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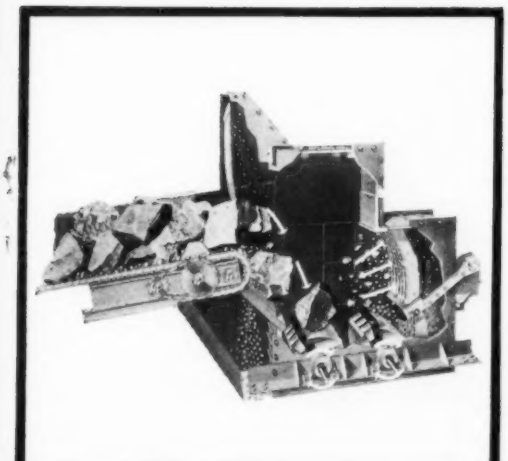

After material is shattered, sized aggregate moves out of the breaking chamber fast . . . no congestion, rebounding or bridging, more efficient use of power.

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Straightline flow makes bonus production possible. And only the Impact Master has it. Fast feeding and discharge is the result of two rotors turning in the same direction. Incoming rock gets the full impact of a square blow and is instantly shattered and thrown towards the upper screen grate. Finished material is immediately removed from the breaking chamber; unnecessary rebounding and congestion is eliminated. Oversize falls into path of second hammer circle and is quickly reduced to size and discharged.

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In one fast operation shovel loaded run-of-the-quarry rock is reduced to finished material.

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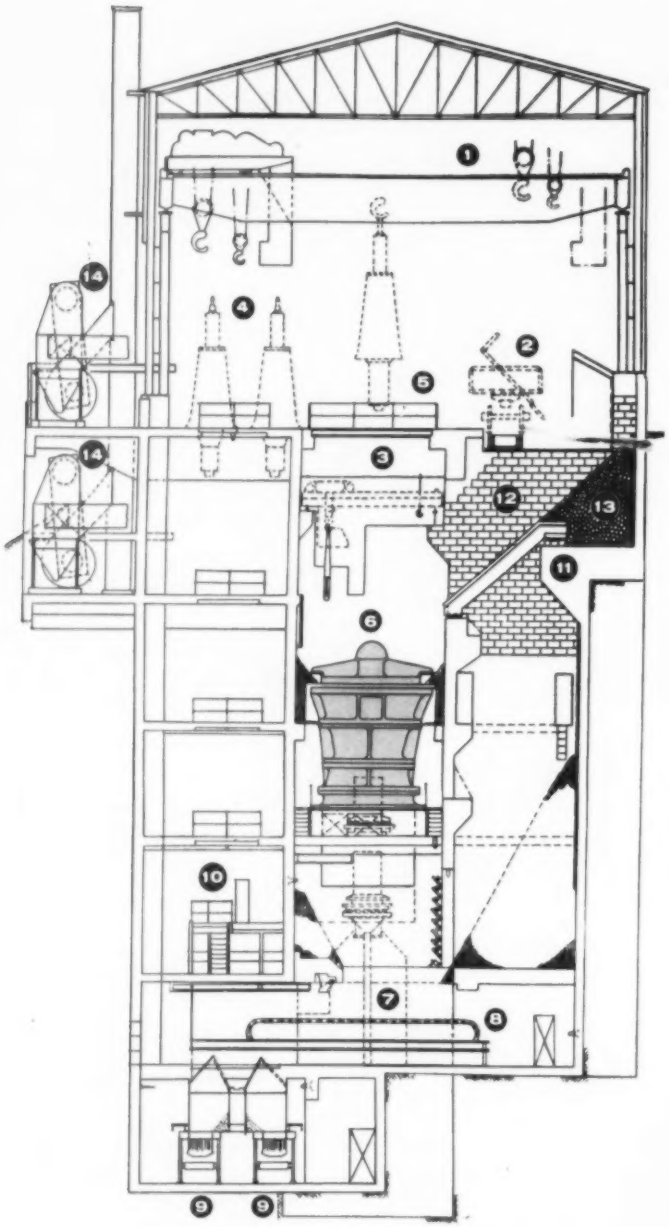

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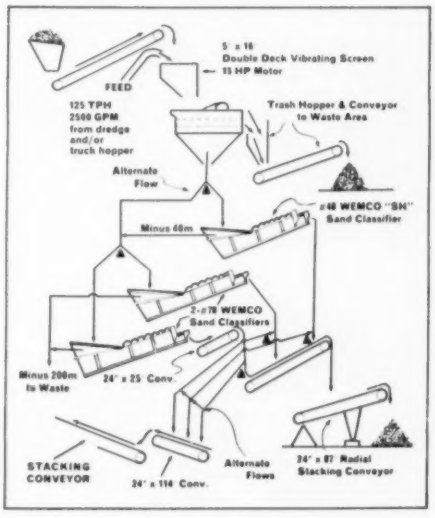

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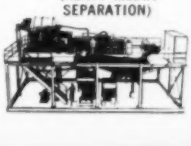

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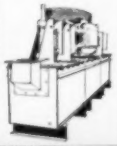

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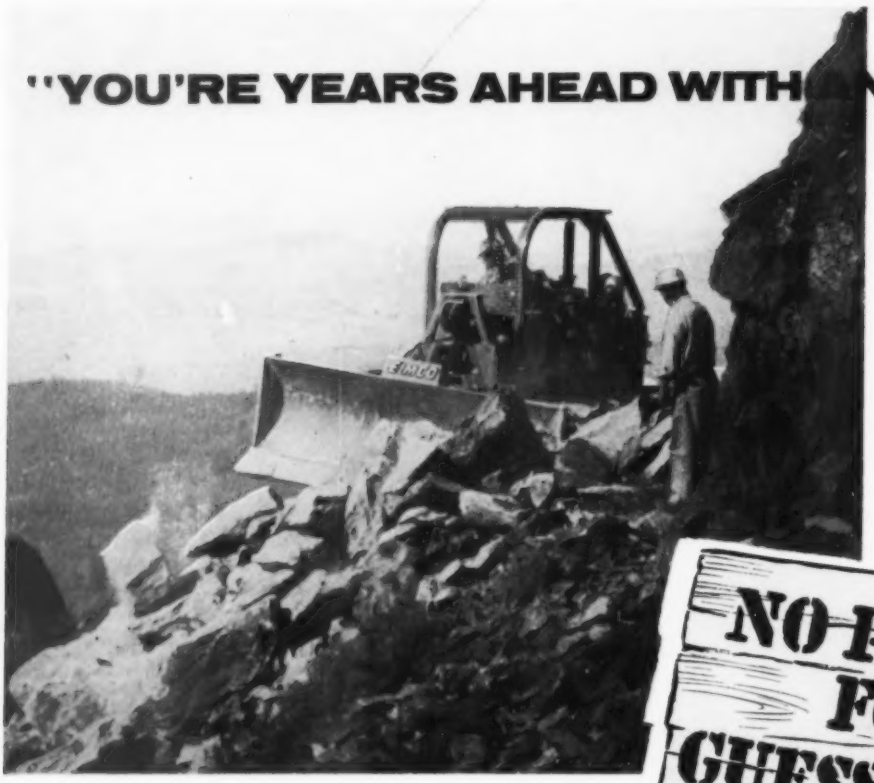

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